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annual report

1962
RICP
annual
report

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CURRENT SERIAL RECORDS

REGIONAL

United States Department of Agriculture

Agricultural Research Service

Plant Pest Control Division

INSECT

in special agreement with

CONTROL

Agency for International Development

Washington, D. C.

PROJECT

Regional Headquarters

Beirut, Lebanon

Regional Insect Control Project Annual Report 1962

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REGIONAL INSECT CONTROL PROJECT
PERSONNEL 1962

Staffing	Name	Remarks
<u>Washington, D. C.</u>		
Asst. to Dir. Foreign Tech. Programs, PPCD, ARS	Edson J. Hambleton	
Secretary	Beatrice L. McCormick	
<u>Beirut, Lebanon</u>		
Coordinator	Roland Q. Gardenhire	
Dep. Coord. & Survey Spec.	Joseph W. Gentry	1/1 - 11/21
Reg. Plant Quar. Spec.	Vacancy	
Entomologist	William H. Pierce	10/28 - 12/31
Administrative Officer	Joseph J. Zeglen	11/26 - 12/31
Administrative Assistant	Mary Eiker	1/1 - 6/4
Secretary	Liza Katmerian	
Secretary	Willie Jo Vickers	6/18 - 12/15
<u>Kabul, Afghanistan</u>		
Entomologist	Edward R. Millet	
<u>Addis Ababa, Ethiopia</u>		
Entomologist	Willis C. Kurtz	
Entomologist	Duane E. Bartholf	2/4 - 12/31
Chief Pilot	Charles D. Klessig	
Pilot	Charles A. Temple	
Pilot	Donald L. Davis	10/8 - 12/31
Pilot	Vacancy	
Pilot	Vacancy	
<u>Asmara, Ethiopia</u>		
Entomologist	W. O. Ridgway	11/8 - 12/31
<u>Tehran, Iran</u>		
Entomologist	George T. Brooks	1/1 - 9/26
Entomologist	Thomas L. Gilliland	4/30 - 12/31
Pilot	Calvin C. Franklin	
<u>Tripoli, Libya</u>		
Entomologist	Robert L. Linkfield	
Pilot	Donald M. Kjos	1/1 - 6/18
<u>Rabat, Morocco</u>		
Entomologist	George E. Cavin	
<u>Khartoum, Sudan</u>		
Entomologist	Arthur Kaatz	
Pilot	Ned R. Powers	
<u>Ankara, Turkey</u>		
Entomologist	Flournoy M. Philips	

NINTH ANNUAL RICP CONFERENCE BEIRUT, NOVEMBER 5 - NOVEMBER 9, 1962



Left to right

Standing

Cavin

Temple

Gilliland

Linkfield

Kurtz

Philips

Powers

Bartholf

Davis

Seated

Pierce

Franklin

Hambleton

Gardenhire

Gentry

Kaatz

Millet

Not shown

Klessig, Ridgway

Regional Insect Control Project

SUMMARY OF ACTIVITIES 1962

Introduction

During 1962 the Regional Insect Control Project activities were expanded considerably. Additional personnel, equipment and insecticides were placed in Eastern Africa for increased desert locust control operations. An RICP aerial spray unit, for use wherever required within the Region, was established in Addis Ababa, Ethiopia. Project technicians continued to extend technical assistance in all phases of plant protection in the Middle East and Africa. The initiation, continuation and the conclusion of various successful projects of technical assistance are reflected in the individual country reports. A total of fourteen countries of the Region received direct RICP assistance during the year. Entomologists were stationed in eight and pilots in four of these countries. Temporary duty assignments of RICP personnel extending up to thirty or more days were made in other countries.

All activities of the project continued to be fully integrated with those of each respective USAID and requests for TDY assistance from the various United States Embassies and USAID Missions were fulfilled as effectively as possible with available personnel.

Desert Locust Situation and Control

Desert locust infestations continued to be heavy in the Eastern Region during the first six months of 1962, with particularly heavy infestations in Afghanistan and Iran. Afghanistan infestations reached the highest level in over thirty years. During the first three months of 1962, infestations in Eastern Africa were moderately heavy but after successful control operations, infestations during the remainder of the year were light. All of Central, West and North Africa remained clear of desert locust throughout the year. Substantial assistance by the United States Government in locust control operations was extended to Afghanistan, Iran and Ethiopia. In Afghanistan and Iran, this aid was given primarily through the AID Missions and with assistance from the U. S. Air Force. RICP spray planes treated almost 200 square miles of locust swarms and hopper bands in Ethiopia during 1962. Most of these infestations occurred in the primary breeding area of Ethiopia where control operations had not been conducted previously. There is substantial evidence that the increased emphasis on locust control in Eastern Africa during the past three years has played a vital part in bringing about the present favorable overall locust situation. By the end of 1962, desert locust infestations had reached such a low ebb that the FAO Technical Advisory Committee on Desert Locust Control meeting in Rome during December 1962, made the following statement:

"This restricted distribution of infestations, together with the power and mobility of the control methods now available, offered an exceptional opportunity for the virtual elimination of swarming populations of the desert locust for the first time in history, by concerted and effective action against the remaining populations."

A completely new concept of locust control now has been envisaged by many of the experts, that is one of "offensive" rather than "defensive" action.

Mr. Frank T. Cowan, Investigations Leader for Grasshopper Control Research of the United States Department of Agriculture, visited a large portion of the locust invasion region from July 31 to September 3, making observations and subsequent recommendations pertaining to this problem. He contacted RICP and government officials in Lebanon, Iran, Pakistan, Kenya, Ethiopia, Syria, Libya and Morocco. This visit from one of the outstanding world specialists in the field of grasshopper control was invaluable to the future implementation of the RICP program.

Regional Locust Control Organizations

A highly significant step in the ultimate goal of conquering the desert locust plague was the establishment of the Desert Locust Control Organization for Eastern Africa (DLCOEA) which became a reality in the late summer of 1962 by the signing of an International Convention by the Governments of Ethiopia, France, Kenya, Somalia, Tanganyika, and Uganda. The British Government is continuing to make substantial contributions to this Regional organization and RICP is coordinating its control efforts to the fullest extent possible with the Organization. Two preliminary meetings were held under the auspices of FAO in an effort to establish an eastern regional Organization which would comprise the countries of India, Pakistan, Afghanistan and Iran. A regional organization for Western Africa has been in existence for the past several years and was established largely through the French Government's technical assistance program.

Insect Survey

Insect surveys of the economically important agriculture insects of the Region continued to be an item of high priority within the Project. Training courses and improved arrangements for taxonomic assistance in the identification of agricultural insects contributed very appreciably to the implementation of this aspect of the program. A comprehensive compilation of the insect pests of the entire Region was nearing completion at the end of the year. It is anticipated that this work will be published sometime during the forthcoming year and will represent a most important reference manual for the entomologists of Africa and the Middle East.

Plant Quarantine

Even though there were numerous requests for assistance with plant quarantine problems within the Region, the position of Regional Quarantine Specialist remained vacant during the entire year. However, as a part of the regular plant protection program within each country, RICP technicians gave rather extensive technical assistance and advice in the field of plant quarantine, fumigation, and other related activities. A number of participant trainees from various countries were sent to the United States for specialized training in plant quarantine. Through the support of the Central Treaty Organization and the cooperation of the Plant Pest Control Division in Washington, duplicates of records in the United States Department of Agriculture Insect Pest Survey Files were distributed to the Plant Protection Organizations in Pakistan, Iran and Turkey.

Temporary Duty Assignments

Temporary duty assignments by RICP personnel were made to a number of countries. The RICP Entomologist from Morocco made an intensive study of the Syrian Plant Protection Department and made subsequent recommendations to the U. S. AID Mission in Damascus as to how technical assistance could most practically be given to Syria. One of the RICP Entomologists from Ethiopia traveled extensively in Yemen, surveying the desert locust situation and contacting many high government officials. He then made recommendations as to how more effective control operations could be conducted in this very important primary breeding area. The RICP Chief Pilot from Ethiopia was detailed to several countries of the Region, including Iran and Sudan. In Iran he conducted a comprehensive aircraft mechanic training course for Iranian personnel. The RICP Pilot-Mechanic Advisor from Iran assisted with a training course for agriculture pilots in Turkey.

Attendance Meetings and Conferences - 1962

FAO:

Technical Advisory Committee for Desert Locust Control, Rome, January (Coordinator and Deputy Coordinator). Special FAO Meeting on Desert Locust Control in Eastern Africa, Rome, January (Coordinator). Desert Locust Control Committee, Addis Ababa, April (Coordinator and Entomologist from Morocco). Technical Advisory Committee for Desert Locust Control, Rome, December (Coordinator).

Other:

Central Treaty Organization Conferences on Insect Survey, Karachi, Tehran and Ankara, September - October (Deputy Coordinator and Entomologists from Iran and Turkey). Desert Locust Control Organization for Eastern Africa (DLCOEA), Asmara, October (Entomologist from Ethiopia). DLCOEA, Nairobi, October (Coordinator). RICP Annual Conference, Beirut, November (entire staff), DLCOEA, Nairobi, November-December (Coordinator).

Regional Insect Control Project

SUMMARY OF ACCOMPLISHMENTS 1962

During 1962, the 21 technicians of the regional staff serviced 14 different countries of the Middle East and Africa and participated in

7 international meetings and held
 23 training sessions reaching
 670 plant protection personnel. In addition pilot-mechanic training was given to
 32 participants
 9 participant trainees were selected for training in programs in the United States or in programs outside their country. A total of
 41 aerial and ground demonstrations were made against
 35 pests on
 9,206 trees
 4,088 acres of crops and on approximately
 7 million cubic feet of grain or grain storage space. RICP spray planes applied
 9,690 gallons of insecticide concentrate to control desert locust on
 108,056 acres of range and crop land.
 94 reconnaissance flights for desert locust were conducted totaling
 251 hours flight time

This resulted in the importation during the year by countries with RICP programs of

20 spray planes
 25 vehicles
 5,341 power applicators
 18,433 hand applicators
 3,396 tons and
 216,600 gallons of pesticide from the U. S. and
 11,465 tons and
 1,108,500 gallons from other sources.

This work was supported by

\$ 114,000 of USAID money,
 800,000 Regional Insect Control funds and
 12,341,990 Government plant protection expenditures. Thus making approximately
 13.50 dollars local money equivalent used for each U. S. \$1.00 expended.

Above summaries include only those countries where full-time RICP technicians were stationed.



REGIONAL INSECT CONTROL PROJECT - 1962

AFGHANISTAN

E. R. Millet

Background

The normal Regional Insect Control Project (RICP) program with the Plant Protection Section of the Royal Afghan Ministry of Agriculture was largely over-shadowed this year by an unusually heavy infestation of desert locust. The appearance of locusts in Afghanistan as early as December 1961 and continuing through August 1962, kept most of the plant protection personnel in the field on this assignment. Consequently, most of the planned program of demonstrations and training was curtailed.

A revised work plan for 1962 was drawn up at the beginning of the year and presented to the Ministry for consideration and signature. The pressing locust activities kept the 1962 work plan from being considered until late August, and as the time had by then passed for most planned activities, there was no need for finalization and signature. A new work plan will be prepared for the 1963 season. The budget for the USAID/Afghanistan Plant Protection Project for this year was \$10,000. Insecticides, consisting mostly of granulated aldrin and emulsifiable malathion and aldrin, as well as wheelbarrow and knapsack sprayers were ordered. An additional \$27,500 budget was appropriated for the locust emergency by USAID/A. Approximately \$12,500 of this was spent for plane rental, hire of spray pilots, and an emergency purchase of aldrin from India.

The Ministry's Plant Protection budget for the year was \$64,930 of local currency equivalent. It was necessary for them to appropriate an additional \$12,410 local currency equivalent for locust control. An amount in U. S. currency of \$50,160 was also appropriated. Making the total Plant Protection budget for the year \$127,500.

Important Accomplishments During 1962

The most important accomplishment during 1962 was the successful operation of the emergency desert locust campaign. Afghanistan was confronted with the heaviest infestation reported in approximately 30 years. Control work was begun in all provinces of Afghanistan in January. By April it was ascertained that the locusts could not be controlled with the equipment and insecticide available in Afghanistan. Additional assistance was requested from the United States through USAID/A.

Through USAID/A the United States provided a U. S. Air Force C-123 spray plane, a Cessna 180 spray plane and two Buffalo turbine blowers mounted on jeeps. Technical assistance was provided by AID Agricultural technicians and RICP personnel.

Control measures were applied to approximately 375,000 acres of hoppers and adult locusts using approximately 925 gallons of aldrin and 528 tons of BHC applied by aircraft, turbine blowers and hand dusters and sprayers. Through the efforts of all concerned the locust threat was controlled and kept from appreciably damaging the food producing crops of Afghanistan.

The Plant Protection Section of the Ministry conducted its normal activities of routine insect and disease control on most of the Ministry farms and gardens throughout the country. Spraying and dusting against cotton pests was conducted on a large Ministry mechanized farm in Kataghan Province in the north.

Insect survey activities were limited during the year. However, ten lots of specimens were submitted for identification. It was also possible to rear a sufficient number of Baluchistan Melon Fly adults for identification purposes. Field trips were made for population checks of several important pests, and for observations for the 1962 summary of insect conditions in Afghanistan.

Training and Demonstrations

One participant returned from two years of plant protection studies in West Germany; one participant went to West Germany for two years of study; and, two are scheduled to leave in December to the United States for one year of special study in plant protection activities. Routine on-the-job training in plant protection was conducted throughout the year.

Spraying demonstrations against the citrus psyllid on oranges at Jalalabad were conducted with fair results. The use of aircraft and aerial spraying for the control of desert locust was well demonstrated in Afghanistan this year for the first time. Very good results were obtained using turbine blowers mounted on jeeps for locust control and against flies and mosquitoes in villages.

Considerable time was spent in fumigating stored grain pests in PL-480 wheat that had been long over-stored in inadequate warehouses. Advice and assistance was also given to the Helmand Valley Authority agriculture program in sanitation practices for storing wheat in local warehouses and in other methods for preventing infestations of stored grain pests.

Important New Developments During the Year

The most important development this year has been the Ministry's cognizance of the seriousness of locust invasions. There is still a lack of sufficient mobile, ground control equipment, but the Ministry budgeted approximately \$18,000 for vehicles and equipment.

Outlook and Future Plans

Afghanistan should anticipate desert locust infestations in 1963 and 1964. Recommendations have been made to prepare for these possible infestations by stockpiling insecticides, caring for equipment and making plans to control the locusts. The Ministry expects to acquire more portable, power dusting equipment and several additional vehicles. A work plan for 1963 will be established and revisions of past plans will be made. The importance of insect survey and detection will be emphasized and work will be continued toward the establishment of a national collection of insects representative of Afghanistan.

REGIONAL INSECT CONTROL PROJECT - 1962

ETHIOPIA

W. C. Kurtz
D. E. Bartholf

Background

Joint Fund Agricultural Projects between USAID/Ethiopia and the Imperial Ethiopian Government (IEG) were discontinued on December 31, 1961. This resulted in a decrease in the general plant protection activities of RICP, since the general functions had previously been financed under the Joint Fund. The Ethiopian Locust Control Organization was formed in 1956 and locust control has assumed the major role in the IEG Plant Protection Department during the period. Ethiopian locust control had previously been financed solely by Ethiopian funds, but due to the great importance of Ethiopia as a primary breeding area of desert locust, RICP support in 1962 was increased and major efforts directed against locusts. Approximately 85% of the population are employed in agricultural pursuits, and every year the crops plus the income for the bulk of the Nation's workers has been jeopardized by swarms of desert locust.

Since late 1961 the Ministry of Agriculture has been preparing a five-year plan which is quite comprehensive, and it is anticipated that through this plan of more effective administration and financing that the Ministry will function more effectively.

Important Accomplishments During 1962Locust Control

Toward the latter part of January heavy hatching took place north of Massawa along the Red Sea Coast. RICP used only one Piper Cub spray plane against this outbreak. Before operations against the numerous hopper bands were completed, eight of the bands matured to fledglings. With the cooperation of the British Desert Locust Survey (DLS) these fledgling swarms were eradicated.

During February and March RICP with the full cooperation of DLS battled an estimated 300 square miles of locust swarms along the railway area in the vicinity of Dire Dawa. Over 6,000 gallons of insecticide concentrate were sprayed before the swarms were either killed or broken up. The remnants of these swarms moved northward out of Ethiopia and added to existing infestations in the Middle East. In July more than 30,000 acres in the Danakil Depression became infested with hopper bands. Insecticide concentrate totaling 2,050 gallons were sprayed on 47 hopper bands. Mortality counts reached 98% and the control operations resulted in saving 100,000 acres of crops and an undetermined number of acres of grassland.

In September reports reached the RICP office that heavy 2nd and 3rd instar hopper bands were infesting rich grasslands, again in the Danakil Depression, but some 60 miles north of the area of the July program. Applying the technique of "strip-spraying", RICP planes sprayed 16,400 acres; the swaths of insecticide being 500 feet apart. Using this spraying technique, 100% mortality was achieved on the 15 large hopper bands infesting the area.

On October 10 heavy hatching took place along the Desse Escarpment of the Rift Valley. This was an easily accessible area for ground equipment, and within five days the Ethiopian Locust Control ground units had controlled 12,352 acres with excellent results.

Although most of Africa was comparatively free of migrating locusts in 1962, the RICP Aerial Unit, with the help of the Ministry, controlled 120,608 acres of settled swarms and hopper bands and sprayed 9,750 gallons of insecticide concentrate. On reconnaissance alone, the RICP Aerial Unit flew 94 flights for a total of 251 hours.

Other Insect and Plant Pest Control

From previous interest aroused in the control of insects, some insecticide was sold at cost from small demonstrational stocks purchased for resale. This small supply of chemicals was purchased for demonstrations and sale if the farmer wished to buy, as chemicals of this type are not normally available in Ethiopia. It is hoped that through demonstrations a demand for chemicals will be created, and then local suppliers will handle distribution. Rats cause much damage to field crops and stored grain. An imported commercially prepared zinc phosphide bait was made available from Ministry stocks. Demonstrations with this bait have been most successful. Pest control is popular, but is not economically feasible for many of the small farmers.

Survey and Quarantine

Survey and quarantine activities were at a minimum during 1962. Survey work accomplished was done by RICP personnel. A quarantine law has been proposed for enactment.

Training

Another important achievement was the training of two Ethiopian spray pilots. These pilots are now trained to help cope with any locust problem in Ethiopia. The training of these pilots is a step forward to the day when Ethiopia can control her own locusts and other insects, and was accomplished by the RICP Pilot Instructors. The availability of these trained spray pilots to fly Ethiopian-owned aircraft further augments locust control potential in the area.

Important Developments

Establishment of a Central RICP Aerial Spray Unit

In line with the current concept of offensive attack against the desert locust, RICP formed a central Aerial Spray Unit in 1962. This unit is

based in Ethiopia which is a central point in the locust invasion area and a primary breeding area. The unit is now made up of one entomologist, 4 pilots and 7 aircraft. RICP's Aerial Unit represents a strong, highly mobile striking force that can be employed against desert locusts. RICP Piper Cubs with the conventional boom-type spray gear, had a maximum swath width of 75 feet. Now, equipped with only two Micronair sprayers, the same plane is capable of a 500 foot swath. In October the arrival of four Cessna 185's bolstered the Aerial Unit to seven fully equipped spray planes based in Ethiopia. RICP insecticide has been placed at strategic locations ready for immediate use against locust swarms or hoppers.

The RICP Aerial Unit is becoming well equipped to combat the desert locust anywhere within the invasion region. With the additional strength of two C-47's expected to be delivered in 1963, the Unit, in cooperation with other locust control organizations, should be capable of handling any locust situation that may arise.

The Aerial Unit is being organized so that it could help combat the locust plague in any country requesting assistance. It is planned to fully cooperate with the newly-formed Desert Locust Control Organization for Eastern Africa (DLCOE). With the combined efforts of National units, DLCOE and the RICP Aerial Unit, it should be possible to bring about an effective and economical control of desert locust in Eastern Africa.

Desert Locust Control Organization for Eastern Africa

One of the most important developments to take place in 1962 was the formation of the Desert Locust Control Organization for Eastern Africa (DLCOE). The countries participating are: Ethiopia, France, Kenya, Somali Republic, Tanganyika and Uganda. This organization replaces the former Desert Locust Survey (DLS) of the Eastern Africa High Commission and the major portion of the assets of DLS have been transferred to DLCOE. Many of the experienced personnel from DLS have also been hired by the new organization.

Outlook and Future Plans

To a large extent the future plans of the Ministry depend on the acceptance and implementation of their proposed five-year plan. With the impetus being offered by the expanded support of RICP to national control units and DLCOE, perhaps within the next five years RICP support can gradually be withdrawn. The supplemental control efforts of RICP during 1962 have already very materially influenced the present low degree of infestations of desert locusts in Eastern Africa.

With the past training and experience of the Joint Fund Pest Control Project technicians, and with competent leadership, expanded work can be accomplished on other pest control problems. This will not only involve further educational and demonstrational work, but increased insect surveys. The enactment into law of the proposed basic pest control regulations will provide a basis for setting up suitable quarantine measures.

REGIONAL INSECT CONTROL PROJECT - 1962

IRAN

G. T. Brooks
T. E. Gilliland
C. C. Franklin

Background

The new Minister of Agriculture, appointed in 1961, has continually worked toward a more efficient and workable plant protection organization. The Minister appointed a committee to review the organization and operations of the Department and make appropriate recommendations.

The recommendations of this committee resulted in the following:

1. The Director General and Pest Control Officer were transferred to other departments, and a committee of three men was set up to supervise the activities of the Plant Protection Department.

2. Plant protection research is now organized into an institute with its own budget and administration. Liaison with the Department is insured through the composition of its governing board, one chair of which is held by the chairman of the Plant Protection Committee.

3. Plant Quarantine is still largely in the development stage, with plant quarantine inspection stations being maintained at Khorramshahr, Bandar Pahlavi and one on the Iraq-Iran border. How much and how far these facilities should expand is still a matter for study and review. A plant quarantine officer has recently been appointed to review this area and make appropriate recommendations.

All program planning for the present is tied in with the reorganization of the Department of Plant Protection.

Important Accomplishments During 1962Locust Control

Desert locusts began to move into Iran during late winter in numbers beyond all expectations. By early April it was determined that the locust situation was beyond the control facilities of the Government of Iran (GOI) and, on request from GOI, the United States Government through USAID/Iran initiated assistance. Four Cessna-185 aircraft, complete with spray units, were purchased; one Cessna, similarly equipped, was hired under contract, and five pilots were employed for a two-month operation. To expedite delivery of the planes the RICP Pilot Advisor proceeded to the United States. To support these planes the U. S. Government brought in an Air Force C-123 spray plane.

Control operations got underway on May 7. U. S. spray aircraft were assigned the primary responsibility of locust control in the Kermanshah and Central Agricultural Ostans. During the last three weeks of the operation the U. S. aircraft were detailed to Fars Ostan. U. S. assistance was directed toward saving crops, particularly wheat and barley, which subsequently produced the highest yields in the last ten years. The ground support of U. S. aircraft was furnished by the GOI military. During this operation it is estimated that the Cessnas and C-123 spray planes sprayed 177,500 acres and protected approximately 452,500 acres of crops. It was reported that a total of 6,175,000 acres were treated for desert locusts in Iran during the year. The GOI reported that the combined control efforts resulted in keeping the crop damage by locusts to less than five per cent. A reporting system for locusts was initiated with the gendarmerie.

Other Insect and Pest Control

Senn pest infestations were unusually heavy this year, particularly in the Tehran and Isfahan Ostans. In the Tehran Ostan 67,500 acres were successfully treated. Five aircraft were used for this operation. It is reported that the biological control for senn pest in the Isfahan area was not very successful this year.

Tobacco blue mold infested the tobacco crop in Gilan Ostan. It was estimated that 40 per cent of the crop was destroyed. At the time of the RICP technicians' visit to this area it was too late to apply control measures. Fungicidal treatment was recommended for the coming year.

An attack of wheat rust on the wheat crop in the Gorgan area caused a critical shortage of seed wheat in the infected area. The loss from rust amounted to an estimated 67%.

The army worm (Pseudaletia unipuncta) was found to be attacking rice in the Gilan Ostan. An investigation was made and control measures recommended. About 500 acres were severely damaged.

Survey and Quarantine

From early spring all of the Department of Plant Protection personnel were assigned to locust control; therefore, they have had very little time for insect survey activities. Plant Protection personnel are working on a survey report system for Ostans, and RICP has been consulted for advice on this project. Quarantine operations are still in the development or planning stage in most of the country.

Aerial Operations

The RICP Pilot Advisor was very active in the spring locust campaign. He also devoted many hours of flying time to the earthquake emergency in early fall at the request of the Mission.

When the Advisor arrived in Tehran in the fall of 1961, all of the twenty Iranian Aerial Spray Unit's Piper Cubs were inoperative. During the locust and senn pest season, however, seventeen aircraft were maintained in airworthy condition and were in operation. Unfortunately, the Unit suffered four fatalities. Two pilots and two mechanics were lost in a total of eight accidents. Three of the aircraft involved were total losses. The other five were repaired and returned to service during the season. Recommendations have been made to improve safety in operations.

At the end of 1962 the Unit had eleven trained spray pilots and two student pilots. Recruitment is underway for eight additional pilots. There are twenty-six mechanics and mechanics' helpers. Twelve planes are currently airworthy; the remaining five require engine overhauls. A contract is currently being negotiated with a commercial airline for the overhaul of twelve spare engines.

Training is a vital and continuous function requiring the bulk of the Advisor's time. During the earthquake emergency, the RICP Chief Pilot came to Iran to continue urgent training needs for the period of time the Advisor was involved in other work. Mechanic classes were conducted in magneto, carburetion, engine oiling systems and top overhauls. Third country training of mechanics is under consideration. Four senior spray pilots have been qualified and designated as spray pilot instructors. Two pilots are currently enrolled in English classes and two pilots are being trained in aerial spraying.

The Iranian Aerial Unit airport is now under construction at Qazvin and should be completed soon. It is anticipated that great improvements in aerial operations will be seen after moving the entire Unit into its own location.

Other accomplishments included the establishment of a perpetual inventory of the spare parts warehouse, closer personnel supervision through the appointment of an Iranian Air Force Colonel to head the Unit, and the implementation of an organizational chart spelling out positions and duties. This reorganization has created a competitive spirit amongst the pilots and mechanics that was lacking heretofore. Life insurance for pilots and mechanics is being investigated. Uniforms for the Unit's personnel have been approved. A mechanic has been assigned to the parts department to reclaim and renovate used and wrecked parts.

Problems and projects which will require attention are:

1. Ground support for aircraft.
2. Pilot-mechanic wage scale.
3. Cross-wind landing instruction for all pilots.

Department of Plant Protection Umbar Renovation

Renovation of the Department of Plant Protection's umbar (warehouse) in Tehran was initiated. This umbar is the storage site of pesticides and spray equipment. Included in this renovation will be the reclaiming of spray equipment to an operational status, making new equipment operational, and setting up a card index system for inventory of pesticides and equipment. This will extend into the ostan as time permits.

Important New Developments

The most important development this year has been the reorganization of the Plant Protection Department.

Outlook and Future Plans

Since the reorganization of the Department of Plant Protection has recently been completed, and new assignments have been given to almost all of the personnel, there seems to be new life in the Department. The outlook is good at this time. RICP personnel plan to work toward a survey and reporting system similar to that employed by the U. S. Department of Agriculture. It is believed that primary emphasis should be placed on survey and reporting of locusts, stored grain insects, wheat rust, and tobacco blue mold. Another field of endeavor will be training of local or ostan-level pest control personnel in spray plane ground support. RICP personnel also plan to work with the Extension Service on publication of control recommendations.

REGIONAL INSECT CONTROL PROJECT - 1962

LIBYA

R. L. Linkfield

Background

Early in 1962 a Five-Year Development Plan for the Ministry of Agriculture and the Nazarates was presented to the Ministry of Economic Development. This plan was not approved and little money was appropriated for the Federal Ministry of Agriculture. The Nazarates have a budget which is separate from the Five-Year plan, therefore, they were able to conduct general pest control activities throughout the year.

No USAID Program Agreements were signed with either the Ministry of Agriculture or the Nazarates.

Important Accomplishments During 1962Locust Control

There were no desert locusts in Libya this year. The Regional Insect Control Project (RICP) Entomologist extended assistance to the Desert Locust Control Section of the Ministry of Agriculture whenever called upon. The RICP Pilot-Mechanic established and equipped an aircraft maintenance workshop, and with the Entomologist conducted training courses in aerial reconnaissance and spray equipment calibration. The position of RICP Pilot-Mechanic in Libya was vacant since June 1962.

Other Insect Control

The RICP Entomologist extended technical assistance to the Ministry of Agriculture and the Nazarates throughout the year regarding observations of insect conditions, insect survey, pesticide recommendations, control and evaluating insect control activities and in formulating proposed plant protection legislation. Through the facilities of RICP, Metaphycus helvolus a parasite of black scale (Saissetia oleae) was introduced into Libya from California.

Survey

Numerous field trips were made to most agricultural areas of Libya to conduct insect surveys for pests of economic importance. A plant pest survey card filing system was developed for Libya. The objective is to establish a record of all of the plant pests of economic importance in Libya. Fifty-five collections of insect pests, predators and parasites were sent to Washington for determination by U. S. Department of Agriculture and U. S. National Museum taxonomists.

Training

Five training courses in different phases of plant protection were held with 127 Libyan plant protection personnel participating. The RICP Survey Specialist from Beirut headquarters conducted two courses encompassing all phases of an insect survey program. While waiting for the approval of the budget it was considered advisable to broaden the training of all plant protection personnel. The RICP Entomologist instructed personnel of the Desert Locust Control Section in other phases of plant protection, including insect survey, trapping, and control measures.

Outlook and Future Plans

It is hoped that the new Five-Year Development Plan will be established so that plant protection activities of the Ministry of Agriculture and the Nazarates may be continued with increased progress.



*other
projects*



REGIONAL INSECT CONTROL PROJECT - 1962

MOROCCO

G. E. Cavin

Background

Due to a relatively large agricultural export trade to an increasingly discriminating European market, Morocco, of necessity, has developed an efficient and effective pest control organization. Through a system of strategically placed regional and branch offices they are able to effectively extend their influence into all the major agricultural areas. This organization is backed up by a group of highly skilled research workers including entomology and plant pathology specialists on the pests of many of the major crops such as cotton, wheat, citrus and olives.

Other government organizations such as the Department of Water and Forests and the Department of Alcohol and Wines also have trained pest control technicians attached to their staffs.

In the main irrigated areas, where the majority of the high value crops exist, farmers have, in many cases, organized cooperative pest control associations, and hired pest control specialists to advise them on specific problems. Many of the larger individual farming operations have even hired subject matter specialists of their own.

A large number of pesticide, manufacturing formulating and distributing companies also keep trained technicians in the field, to advise the farmer on his individual problem.

Status of Program

The RICP program in Morocco, as presently operated, is wholly advisory. Morocco's pest control technicians are fully capable of carrying out an effective program of survey, quarantine, demonstration, training and control under relatively limited guidance.

Organization and Agreements

Morocco is provided assistance in its pest control operations through the technical and economic assistance agencies of the governments of France, Spain, Germany, USA and the Food and Agriculture Organization of the United Nations. Under the agreements with France, Spain, Germany and FAO, specialist technicians are provided for carrying out specific research projects or for pest inspector activities on a fully integrated basis. Personnel thus provided become an integral part of the Pest Research and Plant Protection Services. The United States, through the Regional Insect Control Project, provides a full time technical advisor to the Plant Protection Service.

Budget

With the dissolution of the USAID/Morocco locust control project as of June 30, 1962, no U. S. funds, other than those of RICP are specifically earmarked to Morocco in the field of pest control. However, through other programs and projects, such as Agricultural Extension, Plant Protection materially benefits from U. S. participation.

Important Accomplishments During 19621. Locust Control

Due to the complete absence of locust activity in Western Africa and the indications of a continued calm for an extended period of time, the Government of Morocco (GOM) agreed to a discontinuance of U. S. financial assistance in locust control as of June 30, 1962.

2. Other Insect Control, Survey and Quarantine

As requested by the GOM, the entomology advisor conducted a study of the present plant protection organization and its activities and a study of extension activities in pest control. Summary reports were prepared and recommendations provided for improving present operations and suggestions for possible future program activities.

3. Training and Demonstrations

During 1962 the Plant Protection Service began a concerted drive, through the provision of training and demonstration, to awaken additional farmers to the need for pest control. During the first half of 1962 a total of 102 demonstrations, 26 training sessions and 240 hours of classroom lectures were carried out by field personnel of the Plant Protection Service. This was further expanded through the Agricultural Extension Services who actively engaged in several hundred additional demonstrations.

Important New Developments

The technical assistance agreement signed between the GOM and the West German Government calls for the provision by West Germany of an entomology specialist to investigate control measures on the insect pests of sugar beets.

A plant pathologist was added to the staff investigating citrus diseases to conduct studies of pre shipment treatments to reduce disease losses to fruit in transit.

The new technical assistance agreement between the GOM and France provides for a large number of new technicians several of whom will be actively engaged in pest control investigations.

Blue mold of tobacco was found for the first time in Morocco in June at Quezzane.

REGIONAL INSECT CONTROL PROJECT - 1962

SUDAN

A. Kaatz

Background

The Regional Insect Control Project (RICP) program in the Sudan is a cooperative undertaking fully integrated with, and a supplement to the regular activities of the Plant Protection Division of the Government of Sudan (GOS). The RICP program has been in continuous operation in the Sudan since September 17, 1958 when the first agreement was signed with USAID/Sudan and GOS to aid in emergency locust control. In addition to the regular RICP budget, the GOS regular budget for Plant Protection Division was equivalent to about U. S. \$2,660,000, and USAID/S made available \$35,000 for participants, commodities, and for administrative items.

Important Accomplishment During 1962Locust Control - Desert Locust

During the summer breeding season there were no desert locust invasions. A few very small patches of the solitary phase of locust were found but they were few, widely scattered, and posed no threat. No locust control operations were carried out other than the normal preparations for the control season with limited aerial reconnaissance by RICP. During the winter breeding season desert locust swarms did invade the Red Sea Hills. Short rains in the north limited the breeding, while in the southwest more general rains fell resulting in more extensive breeding. However, the over-all breeding in the area was light. Plant Protection Division ground control teams destroyed the locust hoppers before they reached the fifth stage, thus, effectively preventing the start of a new generation of locusts. The RICP Entomologist was present in the area for several weeks and assisted through advice and guidance. Through continued RICP assistance and guidance the technical competence of the Plant Protection Division has greatly improved in survey and control of desert locust outbreaks.

Locust Control - Tree Locust

Tree locusts invading the cultivated areas along the Nile River are an increasing problem. Control activities were conducted during all months of this year. RICP assisted actively in control campaigns through advice and guidance, assistance in survey, conducting aerial reconnaissance and in aerial spraying of several areas.

Demonstrations

Various demonstrations were conducted in insect control, the use of new or different insecticides, and the use of new types of application equipment. For example, at Port Sudan a fog insecticide applicator was demonstrated by fogging two warehouses in the port area, each two times, with different insecticides in an attempt to control stored products insects. The experiment was very successful in controlling khapra beetle and other insects.

Aerial Units

RICP was without a pilot in the Sudan for part of the year, but a pilot arrived on June 5, 1962.

The Plant Protection Division formed an aerial spray unit this year and obtained two Cessna 180 aircraft. One plane is being used to instruct the four Sudanese pilots at NATP in Addis Ababa, and the other is used for aerial reconnaissance and pilot instruction at Khartoum. The unit has been hampered by a shortage of pilots and maintenance facilities. An airstrip at Gebel Merkhiyat is the operations base for the unit. A control tower has been constructed, a hangar is under construction, and a workshop for maintenance is planned. RICP has advised and actively assisted in all phases of the formation of this aerial unit.

The Sudan has joined the International Agriculture Aviation Center and the Chief of the Plant Protection Division has been appointed Liaison Officer for the Sudan.

Other

Assistance and transportation were extended Dr. R. van den Bosch, Biological Control Division, Citrus Experiment Station, University of California, who spent two weeks in the Sudan looking for beneficial insects. Assistance was also given to the Plant Protection Division field rat control campaign which reached emergency proportions in the Managil District. Through the efforts of FAO and USAID/Sudan emergency supplies of rodenticides were flown to the Sudan. Control was achieved with the help of the elements when a 20 inch rainfall drowned most of the remaining rats.

The RICP Entomologist provided training films and advised and assisted in insect control problems involving programs of other USAID agriculture technicians.

Important New Developments During the Year

The Plant Protection Division formed its own aerial spray unit and converted from the poison bait system to the mechanized ground and aerial spray units for locust control. The RICP spray plane was converted from the boom-type spray gear to the more advanced and economical micronair spray system.

Other Insect Control

Numerous trips were made with Plant Protection Division personnel to observe insect conditions, advise on insect control and pesticides and evaluate insect control activities. This included work on garden, mango, citrus, guava, and other fruit, coffee and cacao, field crops, stored products, and castor bean insects. Through the use of a new insecticide, valuable assistance was given in ridding a nursery of mango scale insects.

Survey

Of great importance to the Sudan, is the survey of cotton insects in government and private schemes conducted by the Plant Protection Division. Last season RICP made suggestions and assisted the Plant Protection Division Chief in developing a system of insect survey for assessing insect infestations. Assistance was also given in formulating a plan of operation and supervision of the aerial spray contractors. This season, slight modifications in these programs were made from observation of last season's activities, and this improved system is now in operation. Last year approximately 200 apprentices received training in the field on insect surveys. About one-half of these are now on the survey teams and are giving insect survey training on-the-job to an additional 100 apprentices.

Quarantine

The GOS enacted a new provision to their Quarantine Laws this year stipulating that all agriculture commodities exported or imported must have an export-import permit and are subject to inspection by a plant quarantine inspector. A multiple-chamber fumigation building under construction by GOS at Port Sudan should be completed and in service early next year. RICP advised and assisted in technical and supply problems connected with this facility as well as with other quarantine problems. The GOS established two new plant quarantine inspection stations during 1962.

Training

Under the participant training program two trainees were sent to the USDA Plant Quarantine Training Course in New York City. Both have returned to the Sudan and are now performing responsible quarantine activities. RICP, in cooperation with the Agriculture Engineering Project, sent six pilot trainees in 1961 for 15 months basic pilot training at the National Airlines Training Project in Addis Ababa. Two of these trainees were dropped from the course but the other four are nearing completion of their training. In addition, RICP has given flight and related ground school instruction to two other Sudanese pilots in Khartoum. The GOS is sending one of these pilots to the United States to a flight school to obtain his pilot instructor, aerial applicator, and float plane ratings.

Outlook, Future Plans, and Miscellaneous

RICP plans to support and assist along the lines set out in the Plant Protection Division Ten-Year Plan which proposes (1) additional mechanization of locust control, (2) establishing additional crop protection regional offices, and (3) establishing additional plant quarantine stations and fumigation centers. RICP is to give aerial application training to the four Sudanese pilots as soon as their basic training at NATP is completed. Plant Protection Division plans to train additional pilots and to establish an aircraft maintenance unit with mechanic training. It also plans to train personnel in entomology and plant quarantine. The Plant Pest Division is to establish a locust control research laboratory in the Sudan with some assistance from the United Nations Special Fund Desert Locust Project. The GOS plans to establish a pesticide formulating plant and a private firm plans to construct another. RICP has been asked by the Civil Aviation Division to advise and give technical assistance in revising the Sudan civil aviation regulations and procedures.

REGIONAL INSECT CONTROL PROJECT - 1962

TURKEY

F. M. Philips

Background

A new agreement has been drawn up and signed between the Plant Protection General Directorate and USAID/Turkey. This plan specifies the areas in which the Government of Turkey (GOT) and Regional Insect Control Project (RICP) will be most active. It establishes a priority system for attacking the problems outlined and points out in general terms how the problems should be solved. A work plan was prepared with the cooperation of the Plant Protection officials and the RICP Entomologist pointing out ways and means of reaching the goals set forth in the agreement.

The Plant Protection General Directorate has prepared a five year plan. This plan deals with the overall plant protection program and what it is expected to accomplish within the next five years. It includes plans for controlling various plant pests as well as the cost estimates of such ventures. Because the Plant Protection General Directorate has, with the help of RICP, prepared plans for the gradual withdrawal from direct control operations, except in instances where insects or plant diseases occur in epidemic form, the estimated cost to the general public for plant pest control is included in the five year plan.

The GOT Plant Protection budget for Turkish FY 62 is TL 57,500,000 (\$ equivalent- 6,388,888). The proposed FY 63 budget is TL 102,000,000 and has been approved by the Minister of Finance at TL 72,000,000. Twenty-five thousand dollars is included in the USAID/Turkey FY 1962 budget of which twenty thousand is for training of four participants and five thousand is for commodities. The FY 1963 USAID/Turkey Plant Protection budget has been approved at the Mission level in the amount of \$35,000 for six participants and \$5,000 for commodity support.

Important Accomplishments During 1962

In an average year the desert locust is of no economic importance in Turkey. However, in April and May of 1962 locust migrated from Syria and Iraq into six provinces in southeastern Turkey where they caused a moderate amount of damage. The accomplishment in this instance is the fact that as soon as the plant protection officials heard that the locusts in Iraq and Syria were moving toward Turkey they detached personnel from other areas to duty in the southern and southeastern border areas along with supplies of insecticides and control equipment.

As a result when the locusts did start migrating across the border, men and supplies were there waiting for them. The Italian locust and the Moroccan locust were of moderate concern in the central and southern areas of Turkey.

A spray schedule prepared for use on cotton insects (pink bollworm, spiny bollworm and others) was very effective.

Sufficient data have been gathered on the senn pest in the Diyarbakir region to indicate that its abundance is greatly influenced by the amount of rainfall occurring in the spring of the previous year. In 1962 the senn pest was so light in Turkey that only 1,750 acres of land were treated with insecticide for control. This followed an extremely dry spring in 1961.

During 1962 two publications of major importance were published by the Quarantine Section of the Plant Protection General Directorate. One is a list of diseases, pests and plants whose introduction into Turkey is prohibited and the other is the Quarantine Handbook for Quarantine Inspectors. A program has been formulated to perform a survey of pests of economic importance for all of the major agricultural regions of Turkey.

Training courses have been conducted in cooperation with the plant protection officials in seven locations in Turkey to train the Plant Protection Agents in extension methods and the proper use and calibration of hand and power operated pest control equipment. Two hundred and fifty persons received training as a result of these courses. Two training courses in insect survey were conducted in Ankara with a total of nineteen technicians receiving training. In Ankara three courses were conducted pertaining to plant quarantine methods with a total of 79 inspectors and technicians participating.

In 1962 tobacco blue mold made further inroads into the tobacco growing areas of Turkey. From a toehold in European Turkey and a margin of Asiatic Turkey in 1961 it spread into, and covered most of, the prime tobacco growing areas of the Aegean coast and the Black Sea coast. There are 38 provinces that raise tobacco in Turkey. In 1961 five of these provinces were infested with tobacco blue mold. At the end of the tobacco season of 1962 there were 27 provinces infested with tobacco blue mold. The loss in 1962 is estimated at 10% of the crop.

The Plant Protection General Directorate has given excellent backing to the establishment and the initial operations of the National Survey Organization and the National Museum. These organizations are directed by a single director and while at the present have a relatively small staff they have made great strides this year. Meetings have been held and committees appointed to work out survey methods on various economic

pests. As a result of correspondence with museums in Europe and the United States a system has been developed for the submission of insect specimens for identification. Attempts have been made, where possible, to rely on taxonomists in Turkey for the bulk of the taxonomic work. These taxonomists are from the government service as well as the private sector. It is planned to send a total of six participants to the United States for training in insect taxonomy. On their return they will be expected to assume the bulk of the taxonomic work and to train additional prospective taxonomists. Two participants will be sent to the United States to work with the USDA, Plant Pest Control Division and upon return to Turkey will become survey specialists with the dual roles of survey and teaching others the techniques of survey.

Observations were made in Iran of the techniques used in rearing and releasing the senn pest parasites Asolcus semistriatus and Asolcus grandis. In areas surrounded with natural cover it is possible to introduce these parasites and maintain a high enough population to effect adequate control. On return to Turkey this information was passed on in detail to the technicians at the Diyarbakir Plant Protection Institute where studies of the senn pest parasites are being conducted.

REGIONAL INSECT SURVEY PROGRAM - 1962

J. W. Gentry

Although duties of Acting and Assistant Coordinator were given priority attention during the year as much time as possible was devoted to survey. The RICP survey program has made real progress in some countries during the past two years. This important phase of plant protection, however, is still in its primary stages on an organized basis. The country programs will need continued careful attention and sound direction from RICP entomologists.

Training

Training programs including private consultation, lectures and demonstrations were given in Pakistan, Turkey and Libya during the year. The latter two countries were visited twice. The Turkish program deserves special mention here. It has received strong endorsement in the Ministry of Agriculture and enthusiastic support from RICP. Some of the outstanding accomplishments and aims of the recently-organized national plant pest survey include establishment of a national insect collection, a national reporting and records system, training of six specialists in the United States and arrangement for identification of pests within and outside the country. Training sessions and establishment of a records systems were highlights of activity in Libya. Since the spring of 1960 one or more training courses have been given in the following countries: Afghanistan, Pakistan, Iran, Turkey, Libya, Tunisia, Sudan and Ethiopia. Modern and practical methods of plant pest survey have been amply demonstrated to each plant protection department.

Checklist of Insect Pests

For the past eighteen months an intense effort has been made to compile a list of economic plant insects of the RICP area showing distribution, hosts, economic importance and pertinent notes on habits and biology. A preliminary list of cotton insects was released in 1961. This has been followed in 1962 with three additional lists covering polyphagous, citrus and cereal insects. Publication of an overall list of insect pests of all major crops in the area is planned for the coming year. Such a work will be especially valuable to RICP entomologists and their plant protection counterparts.

Survey Records System for CENTO

In keeping with a recommendation of the First CENTO Plant Quarantine and Customs Conference, Tehran, 1960, duplicates of records in USDA Insect Pest Survey Files have been made available to plant protection organization in Pakistan, Iran and Turkey. This work was made possible through the support and efforts of the Washington RICP office and CENTO.

Sets of about 8,000 abstractions from world literature on pest conditions in the three countries were delivered to each country in the fall of 1962. Use and maintenance of a national pest record system were discussed and demonstrated at each plant protection department. A total of about 175 officials attended these sessions. These record systems will form a nucleus of vital information for plant protection in each country, and it is hoped that they will stimulate increased interest in survey as a basic necessity in effective plant quarantine.

Introduction of Vedalia into Ethiopia

Surveys in Ethiopia in 1961 indicate a serious need for control of the destructive cottony-cushion scale on citrus and other trees and shrubs. Specimens of vedalia, a highly effective predator, were obtained from Iran and USDA. These were released at two points; however, according to field examinations the predator apparently did not become established in these initial attempts. Further attempts to establish the beneficial insect are planned.

Improvement in Identification Services

Arrangements with British Commonwealth Institute, London and Museum National d'Histoire Naturelle, Paris for assistance in identification of destructive insects were further implemented this year. Services rendered by these organizations are a valuable addition to the generous and important contribution made by the taxonomic units of USDA and the United States National Museum.

USDA Requests

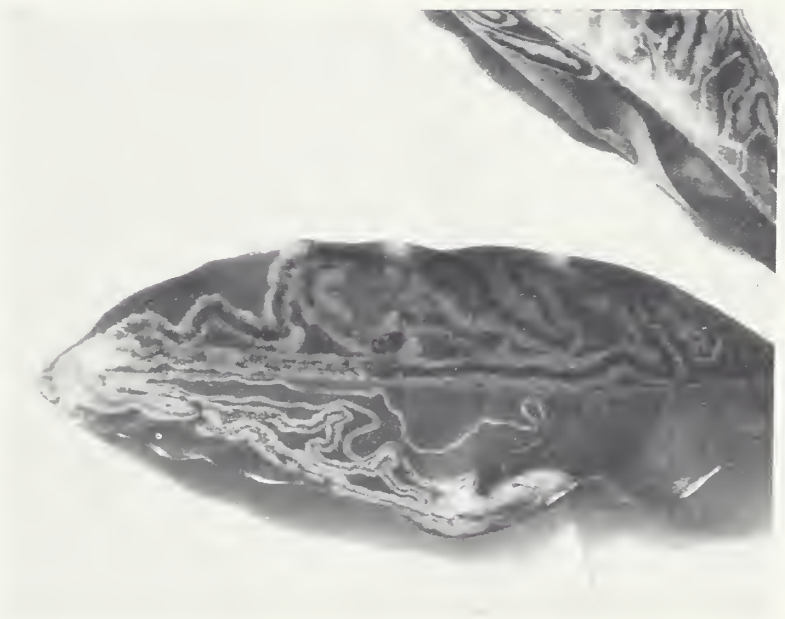
Several requests from USDA, mostly from within ARS, were serviced in 1962. Here are some of the more important. Taxonomists were sent special material, the Plant Pest Control Division detection program was furnished special information and large lots of specimens of important insects and the Plant Quarantine Division received survey information on plant-feeding snails in the RICP area. Efforts to accumulate photographic material for USDA plant protection interests were continued.

Illustrations on Opposite Page

- First row (left to right) : A cotton stainer (Dysdercus nigrofasciatus),
senn pest (Eurygaster integriceps),
black parlatoria scale (Parlatoria zizyphus).
- Second row (left to right): A fruit trunk borer (Cerambyx dux),
durra stem borer (Sesamia cretica),
a cabbage bug (Eurydema ornatum).
- Third row (left to right) : Sugarcane pyrilla (Pyrilla sp.),
a coffee leaf miner,
cereal leaf miner (Syringopais temperatella).
- Fourth row (left to right): Olive fruit fly damage,
oriental hornet (Vespa orientalis),
fig wax scale (Ceroplastes rusci).



*insect
conditions*



SUMMARY OF INSECT CONDITIONS - 1962

AFGHANISTAN

By E. R. Millet

Cereal and Forage Insects

Afghanistan this year had the heaviest invasion of DESERT LOCUST (Schistocerca gregaria) in almost thirty years. Yellows and dark reds appeared along the eastern frontier as early as late December, 1961 and early January. Egg deposition began in mid-March, hatching in April, and fledging in mid-May. Large areas of southern and western Afghanistan was infested. Infestations also occurred up to 40 miles north and 100 miles west of Kabul in mountainous areas up to 8,000 feet elevations. This is unusual for Afghanistan. There were an estimated 150,000 to 190,000 acres of egg beds and hatching sites established in March and April. Control, apparently 85% effective, was applied on an estimated 375,000 acres of hoppers, pinks, and yellows from April to mid-August. Considerable damage was done to alfalfa, mulberry and windbreak trees in the Helmand Valley. Damage to cotton and other crops was very light. ITALIAN LOCUST (Calliptamus italicus) and MOROCCAN LOCUST (Docostaurus moroccanus) were again light in the northern provinces with only a two weeks' campaign against these pests. A local GRASSHOPPER (Chrotogonus trachypterus) was again numerous and caused much damage to vegetables in Lashkar Gah.

WEEVILS (Hypera sp. and Sitona sp.) were again extremely light, only an occasional specimen, in alfalfa in the Kabul area in early September. Hypera postica and H. brunneipennis were identified from Afghanistan collections by Museum National d'Histoire Naturelle, France, during the year. APHIDS (Therioaphis maculata, T. riehmii, and Aphis craccivora) were also extremely light in alfalfa, with only one or two specimen per sweep being found. SENN PEST (Eurygaster integriceps) and a PENTATOMID (Aelia melanota) were again light in the wheat areas at Qaisar and Maimana this past spring and no control was merited. Several species of APHIDS were observed in wheat in the Kabul area, but the infestations were medium. THRIPS (Haplothrips tritici) were numerous in the heads of wheat around Kabul. MIRIDS were noted in alfalfa near Kabul but no extremely heavy infestation was observed. These were probably (Deraeocoris punctulatus, Adelphocoris lineolatus, and Lygus gemellatus, all taken in sweepings.

Fruit Insects

CODLING MOTH (Carpocapsa pomonella) was widespread on apples in Afghanistan this year and caused heavy damage. ERMINE MOTH (Hyponomeuta padellus) was also very destructive to apples, apricots,

and almonds throughout the areas where these are grown. APHIDS were heavy on all fruit trees in Afghanistan, particularly on peaches. The APHID (Pterochlorus persicae) was extremely heavy again this year at Coriz-i-Mir, sometimes covering peach limbs for several inches. An extremely heavy infestation of MITES (probably Bryobia rubrioculus) was noted on several apple trees at the Paghman forest nursery. A SCALE (Lecanium unifasciatum) was also numerous on peaches in the Kabul area. APHIDS were injuring peach trees at Baugh Baulau near Kabul. A GALL-FORMING Hymenoptera, yet undetermined, was again exceedingly heavy and causing abnormal growth and rosetting of buds of peaches at Coriz-i-Mir. Larval stage was observed in July, and some pupation began in August. It is believed that there must be only one generation a year of this pest, with the adults emerging from old growth in early spring and infesting young, tender growth at that time. Thus far collection of adult specimens has been unsuccessful.

Vegetable Insects

CUTWORMS (Agrotis sp.) and WIREWORMS were reported doing considerable damage to sugar beets in Kataghan Province. MELON FLY (Dacus cucurbitae) was not as heavy as last year in the Jalalabad area; at least at the Ministry farm where two applications of malathion were applied to all vegetables and truck crops. Only about 10% infestation was reported in the melon and cucumber crops. This pest was also collected from melons from near Paghman this year. The BALUCHISTAN MELON FLY (Myiopardalis pardalina) was not as heavy in cantaloupes and sweet melons as last year. Infestation was estimated at about 10%. The same holds true for a WEEVIL (Baris granulipennis) in watermelons which developed an infestation of only about 5% this year. BEAN APHID (Aphis fabae) on beets and CABBAGE APHID (Brevicoryne brassicae) on cabbage and mustard were again heavy in gardens in the Helmand Valley.

Citrus Insects

CITRUS WHITEFLY (Dialeurodes citri) and YELLOW SCALE (Aonidiella citrina) were heavy in groves at Jalalabad, with the latter being especially heavy at Laghman. The CITRUS PSYLLID (Diaphorina citri) was extremely heavy in Laghman in early March with as many as six adults on new sprouts of orange trees. There was a very low population in Jalalabad at this time, but they were observed as moderate in mid-summer. A LEAF MINER (probably Phyllocnistis citrella) was observed as heavy on new growth of young citrus nursery stock in Jalalabad in early August.

Cotton Insects

CUTWORMS (Agrotis sp.), APHIDS, and LEAFHOPPERS (probably Empoasca decipiens and E. decedens) were reported as important in cotton in Kataghan Province. Considerable control was conducted

against these pests in this area. SPIDER MITES (Tetranychus sp.) were light on cotton in the Helmand Valley. A WHITEFLY (Bemisia tabaci) was light in the Helmand Valley in July, but was reported as heavy in plots at the research farms at Marja and Bolen in September. SPINY BOLLWORM (Earias insulana) and PINK BOLLWORM (Pectinophora gossypiella) were both normal in the Jalalabad area. E. insulana was light in the Helmand Valley this year.

Forest and Shade Tree Insects

TRUNK BORERS (Aeolesthes sarta and Capnodis cariosa) continue to be destructive to the elm trees along streets in Kabul. Many fully grown elm trees continue to die from the ravages of these pests. Willows and poplars are also attacked.

Ornamental Insects

ROSE APHID (Macrosiphum rosae) were heavy on roses in Kabul this summer. Small white GRUBS did heavy damage to roots of newly-planted roses in Kabul in April. A SCALE (probably Leucaspis or Phenacaspis) was found on several small Cedrus evergreens in Kabul in the fall.

Stored Grain Pests

KHAPRA BETTLE (Trogoderma granarium) larvae were found extremely heavy on walls at edge of bulk wheat in storage houses at Marja and Grishk in the Helmand Valley during the summer. Other pests observed in stored wheat were WEEVILS (Sitophilus granarius and S. oryzae) and RED FLOUR BEETLE (Tribolium castaneum).

Man, Animal and Household Insects

TICKS were annoying to cattle on the Ministry farm at Kabul this year, and there was also a heavy infestation of FOWL TICK (probably Argas sp.) in the chicken houses of the Ministry farm. HOUSE FLY (Musca domestica) and MOSQUITOES (Aedes and Culex) were heavy in Lashkar Gah during the summer months. These were, however, light in Kabul. A COCKROACH (Shelfordella sp.) was observed as lighter this year than last, migrates into houses. A LOUSE FLY (Hippobosca longipennis) was again quite annoying to dogs.

SUMMARY OF INSECT CONDITIONS - 1962

ETHIOPIA

By W. C. Kurtz

Cereal and Forage Insects

A PYRRHOCORID (Dysdercus nigrofasciatus), a cotton insect was collected on sorghum near Wolliso. An APHID (Aphis sorghi)* severely infested sorghum near Simba and corn at Jimma. A medium infestation of a PENTATOMID (Aspavia vittiventris)* was noted on soybeans and grass at the experiment station of the Jimma Agricultural School. A CICADELLID (Tettigoniella cosmopolita)* was possibly associated with a defoliating disease of soybeans at Jimma. Populations were very heavy. CORN PLANTHOPPER (Peregrinus maidis)* was heavy under the leaf sheaths of sorghum and corn at Robi. At Quiha a FORFICULID (Forficula senegalensis)* was prevalent under the leaf sheaths and husks of corn. The NUTGRASS ARMYWORM (Spodoptera (Laphygma) exempta)* was heavy on corn near Nazareth. There was relative light damage from S. exempta this year although generally it causes widespread damage. The SUDAN DURRA BUG (Agonoscelis versicolor) generally caused heavy damage on sorghum in western Eritrea. A COCCINELLID (Chnootriba similis) was found in sweepings from soybeans at Jimma. A LEAF BEETLE (Exora pusilla)** infested teff and wild grasses on range and farms near Jimma. Another LEAF BEETLE (Luperodes exclamationis)** lightly infested soybeans at the same location. A light infestation of a PENTATOMID (Nezara immaculata) was found on growing corn and wheat at Quiha. This species is new to the USNM. Economic loss is experienced almost every year in lower elevation to forage, all kinds of crops and other vegetation by the DESERT LOCUST (Schistocerca gregaria). An ARCTIID (Argina sp. or Utetheisa sp.) was collected on Crotalaria sp. at Alemaya, about 40 per plant. An EARWORM (Heliothis sp. presumably armigera) caused heavy damage to corn and sorghum at Alemaya. A CERCOPID (Locris sp.)* was found lightly infesting grass at Jimma and Alemaya. Commonly found along the roadside feeding on the leaves of broadleaf herbaceous plants was a COCCINELLID (Epilachna (Solanophila) vigintipunctata)*. This species also feeds on grasses. An APHID (Aphis sacchari)* was heavy on corn at Jimma.

Fruit Insects

A DROSOPHILID (Zaprionus vittiger) heavily infested guava at Shashamane and Awash. BLACK PARLATORIA SCALE (Parlatoria zizyphus)

* Det. by USDA or USNM taxonomist

** Det. by Commonwealth Inst. of Ent.

was found lightly infesting orange trees at Wuchale and in areas of Eritrea. Also at the same fruit farm in Wuchale the FALSE CODLING MOTH (Cryptophlebia (Argyroplote) leucotreta)* was doing 4% to 6% damage to navel and mandarin oranges. A TENTHREDINID was light on grape at Ambo. At Debre Zeit a light infestation of a PSYLLID (Spanioza erythrae) caused pitting of the underside of leaves, badly deforming them. This pest is quite common in citrus in most parts of the country. At the fruit market in Addis the STRIPED MEALYBUG (Ferrisia virgata) heavily infested Anona sp. fruit. This fruit reportedly came from Dire Dawa vicinity. At Keren, Eritrea and Dire Dawa BLACK CITRUS APHIS (Toxoptera aurantii) lightly infested citrus. YELLOW SCALE (Aonidiella citrina) and BROWN SOFT SCALE (Coccus hesperidum) were heavy on citrus at Harrar. The latter species was also heavy at Wuchale. A light infestation of three COCCIDS (Africonidia africana)*, OLEANDER SCALE (Aspidiotus hederae)* and (Coccus sp.)* was found on mango near Harrar. The COTTONY-CUSHION SCALE (Icerya purchasi) is generally distributed over Ethiopia on many hosts, with a great amount of economic damage to citrus. Attempts at introducing vedalia beetle in 1962 for control were unsuccessful. Further attempts will be made.

Truck Crop Insects

A LYGAEID (Spilostethus pandurus) lightly infested artichoke at Harrar. A COREID (Acanthomia tomentosicollis)* heavily infested bean pods at Harrar. A PENTATOMID (Eurydema ornatum)* caused light damage to cabbage at Harrar and mustard near Cambolcia. A CABBAGEWORM (Pieris brassicae)* was found feeding heavily on cabbage near Addis Ababa. EGGPLANT FRUIT BORER (Leucinodes orbonalis)* caused light damage to eggplant at Addis. A LEAF BEETLE (Phyllotreta mashonana)* heavily infested cabbage at Jimma. Another LEAF BEETLE (Haltica pyritosa)** was heavy on flax near Robi and light on sweetpotatoes at Jimma. Also at Robi heavy damage was caused to eggplant by a COCCINELLID (Epilachna fulvsignata)*. Light infestation of POTATO APHID (Macrosiphum euphorbiae)* was found on sweetpotatoes at Jimma Agricultural School. A light to medium infestation of THRIPS (Hercinothrips sp. undescribed)* was found on swisschard at Alemaya. A GRACILARIID (Cryphiomystis)* near this genus but new genus and species) mined sweetpotato leaves seriously at Jimma. A light to medium infestation of a MIRID (Halticus sp.) was found on eggplant at Robi. A CURCULIONID (Blosyrus rugulosus ssp. abyssinicus)** was heavy on sweetpotatoes at Alemaya. At Senefe an APHID (Cavariella aegopodii)* was heavy on edible fennel.

Cotton Insects

A PYRRHOCORID (Dysdercus nigrofasciatus) caused considerable damage to cotton near Waldea. At Tandahoe and Ascietta several insects were prevalent such as LEAFHOPPERS, SPINY BOLLWORM (Earias insulana), WHITEFLIES and COTTON APHID (Aphis gossypii). At Ghibe river a heavy infestation of LEAFHOPPERS was reported. Also THRIPS were

quite common. Timely spraying at Tandahoe and Assietta will probably prevent any serious damage.

Coffee Insects

A LYONETID (Leucoptera sp.), a leaf miner, was found causing light damage at Jimma. A light infestation of a PENTATOMID (Calidea bohemani) was noted at Shashamane.

Oil Seed Insects

A PENTATOMID (Veterna abyssinica)* lightly infested flax at Chacha. At same location a heavy infestation of THRIPS (Aeolothrips sp. and Taeniothrips sp.) occurred on flax. A light infestation of a PENTATOMID (Sphaerocoris annulus)* was found on Ethiopian nigerseed (Guizotia abyssinica).

Miscellaneous

A LYCTID (Lyctus brunneus)* heavily infested old furniture at Alemaya. A TERMITE (Odontotermes sp.) was found infesting a house at Addis Ababa. A heavy infestation of GREENHOUSE WHITEFLY (Trialeurodes vaporariorum)* was reported on hollyhock at Addis Ababa. Coccus elongatus was collected from acacia trees in Addis Ababa and Saissetia nigra from false peppertree in Asmara. OLEANDER SCALE (Aspidiotus hederæ)*, FLORIDA RED SCALE (Chrysomphalus aonidum)* and another SCALE (Selenaspidus articulatus)* were severe on palms at Harrar.

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SUMMARY OF INSECT CONDITIONS - 1962

IRAN

By T. E. Gilliland
G. Farahbakhsh

Cereal and Forage Insects

DESERT LOCUST (Schistocerca gregaria) was very heavy in Central, Kermanshah, Khuzestan, Khorasan, Kerman and Fars Ostans. The Iranian Government carried on both aerial and ground control. The U. S. furnished five Cessna 185s with pilots to assist with this project. The effective control campaign reduced the damage to less than five per cent. A total of 6,175,000 acres was reported treated. MOROCCAN LOCUST (Doclostaurus moroccanus) was lighter than normal in Gorgan, Shiraz, Kermanshah and some other areas. Some damage to seedling crops was reported. A total of 172,000 acres was reported

treated. Calliptamus spp. grasshoppers were normal. SENN PEST (Eurygaster integriceps) was heavy in Isfahan, Kermanshah and Ghazvin. Damage was more than usual in these areas. Chemical controls were applied on 98,800 acres. The biological control program was not very effective this year due mostly to a reduced amount of rearing activity. ARMYWORM (Pseudaletia unipuncta) outbreaks occurred on rice in the Caspian Sea area. About 500 acres were severely damaged, but the infestation was generally spotted. DURRA STALK BORER (Sesamia cretica) was light on corn in the Tehran area. ALFALFA WEEVIL (Hypera postica) was the main problem on alfalfa being heavy and warranting controls in the Tehran area.

Citrus Insects

In the Caspian area PURPLE SCALE (Lepidosaphes beckii) was heavy. BLACK PARLATORIA SCALE (Parlatoria zizyphus) was very light but increasing in some areas. BROWN SOFT SCALE (Coccus hesperidum) was heavy in some areas with much sooty mold being evident, especially at Ramsar and Pahlavi. GRAPE MEALYBUG (Pseudococcus maritimus) was heavy at Lahijan, Ramsar and Babolsar. The latter is a new area of developing infestation. A new area of infestation of Pulvinaria aurantii was found at Babolsar. CHAFF SCALE (Parlatoria pergandii) was increasing at Babol. CITRUS RUST MITE (Phyllocoptruta oleivora) and CITRUS RED MITE (Panonychus citri) were very heavy. CALIFORNIA RED SCALE (Aonidiella aurantii), was increasing in Ramsar and Shahsavari. YELLOW SCALE (Aonidiella citrina) was increasing in Babolsar and Babol.

Olive Insects

BLACK SCALE (Saissetia oleae): The parasite (Aphycus (Metaphychus) helvolus) has apparently not become established in the Rudbar area probably due to chemical control and climatic conditions. In the Ramsar area, however, attempts to introduce and establish it have been successful. Other species of Metaphychus are needed in this area to increase the effectiveness of the biological control. OLIVE SCALE (Parlatoria oleae) was very light, parasites being active. OLIVE PSYLLID (Euphyllura olivina) was usually not heavy, but in some areas as much as 20 per cent fruit loss was noted.

Deciduous Fruit Insects

OYSTERSHELL SCALE (Lepidosaphes ulmi) was very heavy, especially in Tehran area. PEAR LACE BUG (Stephanitis pyri) was also very heavy with severe damage noted at Varamin, especially on apple. WOOD BORERS were unusually heavy with many reports in the Tehran area. LEOPARD MOTH (Zeuzera pyrina) was the major species involved, but SHOT-HOLE BORER (Scolytus rugulosus) was also very damaging in some areas. Damaging infestations of OLIVE SCALE were prevalent. A FRUIT TREE MITE (Bryobia rubrioculus) was unusually heavy in the dry season. CODLING MOTH (Carpocapsa pomonella) was normal on apples.

Pistachio Insects

SCALE INSECTS (Lepidosaphes pistachiae and L. pistacicola) were very heavy, especially in Kerman area. PISTACHIO PSYLLID (Agonoscena targionii) was damaging in the Kerman and Rafsenjan areas.

Date Insects

LESSER DATE MOTH (Batrachedra amydraula) was found attacking newly formed dates in southern area of Iran--Persian Gulf Coast. GREATER DATE MOTH (Arenipses sabella) attacked pollen sacs on date palms.

Vegetable Insects

CABBAGE APHID (Breviocoryne brassicae) infestation on crucifers was about normal. CABBAGEWORMS were the main pests of crucifers at Varamin in September. Pieris spp., Plutella maculipennis and Hellula undalis were involved. MELON APHID (Aphis gossypii) infestations were about normal on melons. The main pests of this crop were BALUCHISTAN MELON FLY (Myiopardalis pardalina) and TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina). CUTWORMS (Agrotis sp.) were severe in the Caspian area. TWO-SPOTTED SPIDER MITE (Tetranychus telarius) caused severe damage to beans at Karaj. ONION THRIPS (Thrips tabaci) was also heavy. SUGAR BEET CROWN BORER (Gnorimoschema ocellatella) was very serious on sugar beets. Lixus weevils also caused damage, but were not as heavy as the crown borer. Infestations of BEET ARMYWORM (Spodoptera exigua) were considered normal. APHIDS, mostly Aphis fabae, were damaging on beans.

Cotton Insects

SPINY BOLLWORM (Earias insulana) required controls in the southern region. OLD WORLD BOLLWORM (Heliothis armigera) was heavy in the Caspian area requiring controls. MITES were also a problem with medium infestations at Khorasan. THRIPS infestations were normal. LEAFHOPPERS (Empoasca sp.) and APHIDS (apparently a species of Macrosiphum) were heavy and causing damage in the Varamin area in September.

Tobacco Insects

Heliothis armigera infestations were above normal in buds. GREEN PEACH APHID (Myzus persicae) was heavy.

Forest and Shade Tree Insects

ELM LEAF BEETLE (Galerucella luteola) was unusually heavy in the Caspian area on alder and damaging to this species and elm in other areas. Another CHRYSOMELID (Plagioderia sp.) was also heavy on these trees in the Caspian area. Capnodis BORERS were medium to heavy on poplars in Tehran area. Another BUPRESTID (Capnodis miliaris) caused heavy damage in the central area. Pemphigus APHIDS were normal on poplar. EUROPEAN ELM SCALE (Gossyparia spuria) was medium to severe in the Tehran area and a WHITEFLY (Siphoninus granati) continued heavy on ash in the same area.

Stored Products Insects

Infestations of GRAIN INSECTS were about normal with KHAPRA BEETLE (Trogoderma granarium), RICE WEEVIL (Sitophilus oryzae) and GRANARY WEEVIL (S. granarius) being the most damaging species.

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SUMMARY OF INSECT CONDITIONS - 1962

LIBYA

By R. L. Linkfield
A. Damiano

Cereal and Forage Insects

SPOTTED ALFALFA APHID (Therioaphis maculata) was quite heavy in Tripolitania and the Fezzan. BLACK CUTWORM (Agrotis ipsilon)* caused some damage to small plantings of alfalfa in the Fezzan. Medium infestations of the APHID (Aphis craccivora)* were found damaging maturing alfalfa plants. BEET ARMYWORM (Spodoptera exigua)* caused heavy damage to alfalfa and grass plantings. APHIDS (Toxoptera graminum, Rhopalosiphum maidis, R. padi, and Cuernavaca noxius)* infested small grains throughout Libya. A TETRANYCHID MITE (Tetranychus frater)* was found infesting soybeans in Tripolitania. DURRA STALK BORER (Sesamia cretica) was very damaging to all plantings of corn.

Fruit and Olive Insects

In general the OLIVE FRUIT FLY (Dacus oleae) infestations were medium throughout the country. On June 1, eggs and larvae were found in olives. A SCOLYTID (Phloeotribus scarabaeoides) caused severe damage to the growing tips of olive trees. Pupae of the CODLING MOTH (Carpocapsa pomonella) were first observed the last of February while the adults were observed on March 9. Heavy damage was caused to pears, apples and quince in the Tripoli area. Populations of a SCALE INSECT (Pollinia pollini) were heavy on olive trees along the coastal areas of Tripolitania. STRIPED HAWK MOTH (Celerio lineata livornica)* was present in some grape vineyards. The distribution and damage caused by this pest have not been determined. Light infestations of ROSY APPLE APHID (Anuraphis rosea)* were found on apple trees in Cyrenaica. Pear and plum trees were heavily attacked

* Identified by USDA or USNM taxonomist.

by a FRUIT-TREE MITE (Bryobia rubrioculus)*. In March, a MITE (Cenopalpus pulcher)* damaged buds and flowers of quince in Tripolitania. FIG WAX SCALE (Ceroplastes rusci) caused complete loss to fig crops in several areas of Tripolitania.

Citrus Insects

This year extremely high populations of the MEDITERRANEAN FRUIT FLY (Ceratitis capitata) occurred. In one citrus grove alone, 500 flies were caught in five Steiner traps in one week. Besides heavy infestations attacking tangerine and the early orange varieties, high populations were found in a persimmon grove. Malathion and protein sprays are being used wherever possible. Heavy infestations of both the TWO-SPOTTED SPIDER MITE (Tetranychus telarius) and the PRIVET MITE (Brevipalpus obovatus) were observed where chemical control had been applied for scale insect control. BLACK PARLATORIA SCALE (Parlatoria zizyphus), CHAFF SCALE (P. pergandii) and DICTYOSPERMUM SCALE (Chrysomphalus dictyospermi) were found infesting many groves at varying degrees of intensity.

Vegetable Insects

Medium infestations of the BEAN APHID (Aphis fabae)* were found attacking beets and swisschard in Cyrenaica, and heavy infestations were observed on broadbeans in Tripolitania. GREEN PEACH APHID (Myzus persicae)* caused light to medium damage on eggplant, parsley, hot peppers and radish in the Fezzan. TURNIP APHID (Rhopalosiphum pseudobrassicae)* was very heavy on plantings of radish at Sebha. Light infestations of APHIDS (Macrosiphum sp. and Aphis sp.)* were found on eggplant in Sebha. An APHID (Aphis craccivora)* caused considerable damage to broadbeans at the Experiment Station in Brak. A light infestation of an APHID (Dactynotus cichorii)* were found on chickory at Derna. The APHIDS (Anuraphis foeniculus, Hyadaphis coriandri, and Cavariella aegopodii)* were present on dill. CABBAGE LOOPER (Trichoplusia ni)* caused light damage to lettuce on some truck farms in Cyrenaica. A PIERID (Pieris brassicae)* and CABBAGE APHID (Brevicoryne brassicae) were the major limiting factors in good cabbage production throughout the country. PENTATOMIDS (Graphosoma semipunctata and Tholagus flavolineatus)* were very heavy on the flowers of dill and carrot. DERMESTIDS (Anthrenus sp. and Attagenus sp.)* were found feeding on the seeds of dill and onion. TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina)* was the primary pest of cucurbits in the Fezzan. Damage by this pest was estimated to be over 40%. A CURCULIONID (Cleonus sp.)* was very heavy on plantings of swisschard in the Sebha area of the Fezzan. A NOCTUID (Heliothis armigera) was first observed in January on early tomato varieties. A CUTWORM (Agrotis sp.) caused serious damage to watermelons in Tripolitania. SPINY BOLLWORM (Earias insulana) was very heavy on okra. A SPHINGID MOTH (Herse convolvuli) caused severe damage to the leaves of sweetpotato and morning-glories.

Other Field Crop Insects

Infestations of COTTONY-CUSHION SCALE (*Icerya purchasi*) were found on castorbean plants in Tripoli. A PYRALID (*Nephoteryx* sp.) infested plantings of castorbean. Very heavy infestations of a CRICKET (*Brachytrupes megacephalus*) occurred this year in peanut plantings. In some cases, the farmers had to plant a second crop, the first having been completely destroyed. A PYRALID (*Antigastra catalaunalis*) was very heavy on sesame plantings.

Ornamental and Forest Insects

The TULIP BULB APHID (*Anuraphis tulipae*)* caused considerable damage to iris plantings in Cyrene, while an APHID (*Anuraphis helichrysi*)* attacked marigold flowers in Derna. The PHYTOSEIID MITE (*Phytoseiulus persimilis*)* damaged violets in Tripolitania. Zizyphus trees in the Mourzouk oasis of the Fezzan were infested with a WHITEFLY (*Aleurolobus niloticus*)*. A MEMBRACID (*Oxyrachis tarandus*) was very heavy on *Acacia juliflora* in the Misurata area. The TORTRICID (*Cacaecimorpha pronubana*) caused considerable damage to commercial plantings of carnations in the Tripoli area. Infestations of the LYMANTRIID (*Casama innotata*) were light this year on *Acacia horrida*, probably due to the active pupal parasites *Hockeria unicolor* and *Pimpla instigator*. A BLISTER BEETLE (*Zonabris oleae*) caused severe damage to a planting of seed snapdragons in Cyrenaica.

Insects Affecting Man and Animals

In the market area of Gemel, Tripolitania, a very heavy infestation of the ARGASID (*Ornithodoros savignyi*)* occurred. The entire market area had to be sprayed. The IXODID (*Hyalomma impeltatum*)* was found on the ground near the houses of farmers. FLEAS, BEDBUGS AND COCKROACHES were the three main household pests in Libya.

Beneficial Insects

Ceroplastes rusci and *Saissetia oleae* were effectively controlled by the PTEROMALID (*Scutellista cyanea*). Collections of this parasite were field-released at Nalut, where *C. rusci* had destroyed this year's fig crop. The COCCINELLID (*Scymnus* (*Pullus*) sp. probably *testaceus*)* was very active on orange and pomegranate trees in Cyrenaica. Mite populations were very low in orchards observed having this predator. Large populations of COCCINELLID (*Coccinella 11-punctata*)* were effectively controlling the spotted alfalfa aphid (*Therioaphis maculata*) in Brak, Fezzan. The spotted alfalfa aphid was being controlled in Mourzouk by a BRACONID (*Trioxyis utilis*)* and in Brak by a PTEROMALID (*Pachyneuron* sp.)*. The ENCYRTID PARASITE (*Aphycus helvolus*) was introduced into Libya for the first time this year. The parasite was field-released at an olive plantation in Homs, Tripolitania for control of the Black Scale. VEDALIA (*Rodolia cardinalis*) was effectively controlling the cottony-cushion scale in most areas of Tripolitania. A BRACONID (*Diaeretiella rapae*) heavily parasitized *Brevicoryne brassicae*.

SUMMARY OF INSECT CONDITIONS - 1962

MOROCCO

By G. E. Cavin

Cereal and Forage Insects

No invasions of the DESERT LOCUST (Schistocerca gregaria) occurred in 1962. Morocco has now been free of the desert locust since February 1961. A buildup of MOROCCAN LOCUST (Doclostaurus moroccanus) in the vicinity of Debdou and El Aouina necessitated control measures on 7700 hectares. Populations of Aelia and Eurygaster were generally low. Some slight damage was reported in the Fez-Meknes area. HESSIAN FLY (Phytophaga destructor) caused severe damage to soft wheat fields in many areas during the early spring. A heavy attack on corn sorghum and alfalfa by BEET ARMYWORM (Spodoptera exigua) occurred throughout the Rharrb Plain and at Casablanca in May and June. DURRA STALK BORER (Sesamia cretica) was heavy on corn near Agadir, sorghum at Tangier and Sudan grass at Kenitra in August.

Citrus Insects

Heavy attack of MEDITERRANEAN FRUIT FLY (Ceratitis capitata) occurred in the Souss Valley in spring. CALIFORNIA RED SCALE (Aonidiella aurantii) continued to be the most serious citrus pest. New infestations were found in several locations, but all were isolated and no appreciable extension of the general infested area occurred. GLOVER SCALE (Lepidosaphes gloveri) was heavy on oranges and pomelos at Kenitra in April. DICTYOSPERMUM SCALE (Chrysomphalus dictyospermi) was light on tangerines at Pt. Bouchita. BROWN SOFT SCALE (Coccus hesperidum) was abundant on young citrus plantings at Kenitra and Marrakech in August and September. COTTONY-CUSHION SCALE (Icerya purchasi) was generally light but widespread on oranges and tangerines. CITRUS MEALYBUG (Pseudococcus citri) and CITRUS BUD MITE (Aceria sheldoni) were common at Zaio. A light infestation of TWO-SPOTTED SPIDER MITE (Tetranychus telarius) was observed at Kenitra in August. FLORIDA RED SCALE (Chrysomphalus aonidum) was light but general throughout most of the Rharrb Plain. BLACK CITRUS APHID (Toxoptera aurantii) infested oranges at S. Aissa in May.

Grape Insects

Grapes were attacked by Retithrips syriacus near Marrakech in September. GRAPE ERINEUM MITE (Eriophyes (Phytoptus) vitis) was serious at Kenitra in April. STRIPED HAWK MOTH (Celerio lineata livornica) was found occasionally in the vicinity of Beni Amar in May. A FLEA BEETLE (Haltica lythri ampelophaga) was found in one vineyard at Oujda. GRAPE PHYLLOXERA (Phylloxera vitifoliae) and a MEALYBUG (Pseudococcus sp.) were also reported, the latter being heavy at Moghrane.

Olive Insects

In April and May Saissetia oleae, Brachyrhinus (Otiorrhynchus) cribricollis, Zonabris (Mylabris) oleae, and Prays oleellus were common at Midar and Zaio and Euphyllura olivina at Zaio in July. OLIVE FRUIT FLY (Dacus oleae) was general throughout the olive growing area, the attack increasing in September in the Mediterranean areas.

Miscellaneous Fruit Insects

CODLING MOTH (Carpocapsa pomonella) was common in peach and apple orchards throughout the Rif and Middle Atlas Mountains, and on the plain at Fez and Meknes in August. A severe outbreak of PEACH BUPPRESTID (Capnodis tenebrionis) occurred in stone fruits and mulberry at Sefrou in August and September and MEDITERRANEAN FRUIT FLY (Ceratitis capitata) attacked late pears at Kenitra. Extensions of the areas of date palms infested with PARLATORIA DATE SCALE (Parlatoria blanchardi) were found at Ksar es Souk, Erfoud and Goulimine.

Vegetable Insects

Adults of a CHAFER (Rhizotrogus sp.) damaged peas at Marrakech in February. BEET ARMYWORM (Spodoptera exigua) caused severe damage to peppers at Casablanca and was widespread on the Rharb plain on sugar beets, peppers, artichokes and tobacco. A WEEVIL (Lixus junci) and a CROWN BORER (Gnorimoschema ocellatella) caused severe damage to sugar beets at Nodor and Sidi Slimane. In May TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina) was heavy on squash at S. Yahia du Rharb and Aphis sp. on broadbeans at Kenitra. Heliothis armigera, Agrotis (Euxoa) segetum, Autographa (Phytometra) gamma and Celerio lineata livornica were general on most vegetable crops throughout the Mediterranean coastal areas. A NEMATODE (Meloidogyne sp.) caused some damage to tomatoes at Ben Achen in May.

Cotton Insects

Populations of SPINY BOLLWORM (Earias insulana) and PINK BOLLWORM (Pectinophora gossypiella) were kept at low levels due to repeated insecticidal treatments. Gryllus bimaculatus, Empoasca lybica and Tetranychus sp. were light at Monte Arruit.

Forest Insects

Populations of GYPSY MOTH (Porthetria dispar) were generally light. Some slight defoliation of cork oaks occurred near Rabat and Kenitra. PINE PROCESSIONARY MOTH (Thaumetopoea sp.) populations were heavy on pine and cedar near Ketana in April.

SUMMARY OF INSECT CONDITIONS - 1962

SUDAN

By Arthur Kaatz

Cereal and Forage Insects

DESERT LOCUST (Schistocerca gregaria) invaded the Red Sea Hills and Coastal area (Winter Breeding Range) after light rains in November 1961 and again in December and mid-January 1962. Short rains in the north limited the breeding to four small areas while in the southwest general rains facilitated more extensive breeding. The overall locust invasion and breeding throughout the area was light. Only 30 swarms and 114 locust hopper sites were recorded. All hoppers were destroyed before they reached the 5th instar. In the Summer Breeding Range (a wide belt across north central Sudan extending from Chad Borders up to near the Red Sea Hills) where invasion and breeding is normally the heaviest there were no locust invasions. A very few small patches of the solitary phase desert locust were found but they were few and widely scattered and posed no threat. TREE LOCUST (Anacridium moestum melanorhodon)* infestations have increased steadily during the last three years and this year was present all year in Northern, Khartoum, Kordofan, and Darfur Provinces. Breeding took place for the first time in Northern and Khartoum Provinces in July, August and September. This locust is widely scattered in the small trees and bushes found in the desert wastes. When they have denuded the trees or the vegetation dries up in the desert, the locusts, flying at night invade cultivated areas along the Nile River, threatening sorghum and other vegetation. In this area control activities were aimed at keeping the tree locusts from devastating cultivated crops, rather than an eradication campaign, this control was successful. It may be necessary to direct a major control campaign against this insect in coming months.

TROPICAL MIGRATORY LOCUST (Locusta migratoria migratorioides) was present in many places where tree locusts were found but were few in number except at Khasim el Ghirba where 17 acres of sugarcane were sprayed in order to save a variety trial. DURRA STALK BORER (Sesamia cretica) was widespread in sorghum fields of Central Sudan with extensive damage in local areas. Sugarcane in Blue Nile Province was also infested. SOUTHERN GREEN STINK BUG OR GREEN VEGETABLE BUG (Nezara viridula)* was heavy in sorghum and millet heads during milk stage in the Tokar Delta in January and February. It was also found on sorghum in the Equatoria Province. TWO NOCTUIDS (Heliothis armigera and H. peltigera) infested sorghum and millet in the Tokar Delta during January and February. ALFALFA APHIDS (Therioaphis maculata* and Aphis

* Identified by USDA or USNM taxonomist

craccivora)* were found in berseem fields near the Northern Nile River during February and March. Parasites are present in great numbers and apparently keep the aphids under control. GRASSHOPPERS of all species were numerous and general this year. Slight damage to sorghum and sesame crops were reported from many areas. A BLISTER BEETLE was reported damaging sorghum, millet and sesame crops in Darfur Province. A MIDGE was reported causing damage to sorghum heads in the Southern Butana district. BEET ARMYWORM (Spodoptera exigua) infesting 30 acres of peanuts, berseem and kenaf at the demonstration farms of Khasim el Ghirba was sprayed in July. A FLEA BEETLE infestation on kenaf and guar (a pulse) had to be sprayed in Khasim El Ghirba to save trial plots.

Fruit Insects

GUAVA FRUIT FLY (Pardalaspis quinaris) was serious in a few guava orchards in the Northern Province. Sanitary cultural practices were more effective than sprays in controlling this insect. A LEAF MINER (not identified) in citrus is widespread over most of the Sudan causing considerable damage. THE SCALES (Lepidosaphes tapleyi* and Parlatoria pseudaspidiotus*) on mango trees were found in most orchards in Northern and Khartoum Provinces. During June, July and August a spraying campaign was carried out in Khartoum Province to clear approximately 35,000 mango seedlings from infestation. Elsewhere all along the Nile River small orchards were reported being sprayed successfully. PARLATORIA DATE SCALE (Parlatoria blanchardi)* is serious in the date palm region of Northern Province. Very few schemes were sprayed and treatment was not always successful. Up to 60% of the date palms in the Dongola-Nile reach are attacked by a TERMITE (Odontotermes sudanensis)*. SCALE INSECTS on citrus in the Sennar District and along the Nile River were sprayed. MEALYBUGS were a persistent pest this year on guava, grapes, mangoes and citrus in Northern and Khartoum Province. HIBISCUS MEALYBUG (Phenacoccus hirsutus) on grapefruit and oranges was reported in Khartoum Province. A mealybug-ant complex on guava in the Shendi District and on grapes in Khartoum was sprayed and successfully controlled. Mealybugs were also found on pineapple in Equatoria but were not a problem this year. TWO SPOTTED SPIDER MITE (Tetranychus telarius) on grapefruit and oranges in Khartoum were sprayed during March and April, attacks were light but widespread. Light infestations were reported on citrus along the Dongola-Merowe Nile reach. Light infestations of a CATERPILLAR (Papilio sp.) were found in most of the citrus growing areas. Spraying was carried out on 700 citrus seedlings in Equatoria and on 30 acres of young trees in Khasim El Ghirba. GRASSHOPPERS were general on all young citrus trees but damage was light except in Equatoria where 700 citrus seedlings were sprayed.

Vegetable Insects

THRIPS infestations were heavy in all vegetable growing areas. In the Shendi District 150 acres of onions were sprayed to control thrips, 30 acres were sprayed in Khartoum, and many acres in smaller patches were sprayed in other regions. RED MELON BEETLE (Raphidopalpa foveicollis)* and TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina) were reported heavy on cucurbits and beans.

BLISTER BEETLE (Mylabris sp.)* was severe on okra, tomatoes, and beans during September and October in Darfur Province. They were also reported on sorghum in the same area and on melons along the Blue Nile River. FLEA BEETLES severely attacked okra wherever planted, especially in Darfur, Blue Nile, and Equatoria Province. A FRUITWORM (Heliothis armigera) attacked tomato fruit along the Nile River. Many plantings had to be sprayed. SOUTHERN GREEN STINK BUG or GREEN VEGETABLE BUG (Nezara viridula)* was severe on tomatoes at Arbaat Wells. A HORNWORM and a SWEETPOTATO WEEVIL (Cylas formicarius)* were found on sweet-potato in Equatoria. CABBAGE APHID (Brevicoryne brassicae)* caused severe damage and crop loss on cabbage at Wad Ramli demonstration farms. WHITEFLIES and LEAFHOPPERS were reported on tomato and eggplants in most areas and were suspected of being vectors of leaf curl on tomatoes. A FRUIT FLY (Dacus sp.) attacked most melon fields and ruined much of the fruit. Only the most progressive scheme owners sprayed their melon fields. A CABBAGEWORM required controls on cabbage in Equatoria. A TINGID (Urentius echinus)* was found in many areas on eggplant.

Cotton Insects

COTTON JASSID (Empoasca lybica) occurred this year in all cotton growing regions. In the Gezira, White and Blue Nile reaches aerial spraying on an estimated 600,000 acres of cotton started the last week in September and repeated sprayings are to be carried out into January 1963. This year the Tokar Delta also was affected by jassids during January through March. Hopperburn was severe in places but no controls were conducted. Six thousand acres of early cotton at Zeidab in Northern Province were sprayed early in July. COTTON WHITEFLY or SWEETPOTATO WHITEFLY (Bemisia tabaci)* is as widespread as the jassids. Spraying operations were combined with jassid control with the same acreage being sprayed. The infestation was reported heavy in the Northern Gezira and varied greatly in the rest of the Blue Nile and White Nile Districts during early October but became heavier by November necessitating spraying in all areas. COTTON APHID (Aphis gossypii) was general in all cotton fields in Equatoria but caused no damage. On Tokar Delta cotton, heavy deposits of honeydew lowered the cotton grade. Parasites and predators reported present in Tokar but not numerous enough to control the aphids. Aphids were also reported in Sennar, Singha, and Dueim Districts. A COTTON THRIPS (Hercothrips (Caliothrips) fumipennis) was reported in Dueim District in October on five different schemes. Up to 50% damage was reported in 2200 acres of cotton at Semieh Scheme. Parts of this scheme were later sprayed, also five schemes at Dueim. A FLEA BEETLE (Podagrica puncticollis) destroyed approximately 6000 acres of cotton seedlings in the Gedaref District during August and September. An additional 15,000 acres was saved by spraying the edges of cotton fields and adjoining fallow fields. It was also reported in the early sown cotton along the Blue Nile reach and in the Nuba Mountains. COTTON STAINERS (Dysdercus sp.) infested cotton in Equatoria, Tokar Delta and Gash areas. A campaign for control was carried out in the Nuba Mountains. THE BOLLWORMS (Heliothis armigera and H. peltigera) infested about 60,000 acres of cotton in the Tokar Delta during January through March, causing enough damage to ruin most of the first and second pickings. In October at Gedaref 15,000 acres

were reported heavily infested with both H. armigera and SUDAN BOLLWORM (Diparopsis watersi). South of Kosti and south of Sennar both H. armigera and D. watersi were reported in January, February and March, and again in October on this season's crop. Many schemes were sprayed to control H. armigera. Sudan bollworm was also reported in Nuba Mountains and the Gash Scheme. SPINY BOLLWORMS (Earias insulana* and E. biplaga) were both reported in the Tokar Delta and in the Nuba Mountains. Earias insulana was also reported along the White Nile south of Kosti and on the Blue Nile south of Sennar. PINK BOLLWORM (Pectinophora gossypiella) is present along the Blue and White Nile but is kept under control by heat treatment of all cotton seed and clean cultivation measures. Equatoria, where clean cultivation practices are lax, reported heavy infestations in several local areas near Nzara. Other insects reported on cotton were a MIRID (Helopeltis sp.) and a LEAF MINER in Equatoria. A PSYLLID, which migrated from the Congo was reported to be serious on leaves in several areas. COTTON SEED BUG (Oxycarenus hyalinipennis)* was reported in Tokar Delta and Equatoria. EGYPTIAN COTTONWORM (Prodenia litura) was present in the Gash where cotton fields were adjacent to infested castor fields. This pest was reported for the first time on cotton in the Nuba Mountains where about 1000 acres were sprayed. A LYGUS BUG damaged terminal buds and leaves of young cotton near Suki on the Blue Nile, 10,000 acres were sprayed. COTTON STEM BORER (Sphenoptera gossypii) is present in the Gash and may become a problem as cotton stalks are now saved as stock material for a paper factory. Many stemborers were found emerging from this material. GRASSHOPPERS, CRICKETS and TERMITES caused slight damage in most of the cotton growing district. A TERMITE (Microtermes aluco)* was reported in Tokar Delta.

Stored Products Insects

KHAPRA BEETLE (Trogoderma granarium) is present in much of the Sudan and is the major insect pest of stored products. Two storehouses at Port Sudan were given fog treatment and several shipments of agriculture products were fumigated, otherwise no controls were conducted. The FLOUR BEETLES (Tribolium confusum and T. Castaneum) are found in and on agriculture products wherever stored. Several storehouses at Port Sudan were treated for control but no other controls were undertaken except fumigation of exports on request. Other insects frequently found in varying numbers were GRAIN MOTH (Corcyra sp.), CADELLE (Tenebroides mauritanicus), SILVERFISH, COCKROACHES, RICE WEEVIL (Sitophilus oryzae) and LESSER GRAIN BORER (Rhyzopertha dominica). A BEETLE, probably cigarette beetle, ruined several large inventory stocks of cigarettes in Juba. A WEEVIL (unidentified) was reported in stored tobacco at Yei and Maridi.

Castorbean Insects

Castorbeans are grown in the Gash Scheme and on a few small schemes in the Northern Province. While many caterpillars were present this year, only two caused any appreciable damage, the NOCTUIDS (Prodenia litura and Achaea catella). Two parasites, a PHORID (Megaselia sp.)*

and a CHALCID (Brachymeria euploeae)*, found in great numbers in the Gash, have apparently controlled many of the caterpillars. GRASSHOPPERS (many species) caused the only other reported damage and about 1000 acres were sprayed around the edges of fields to kill grasshoppers moving in from adjoining fields. Other insects reported on castorbean: a PYRALID (Phycita poteriella) on leaves; LEAFHOPPERS (Erythroneura sp.); NOCTUIDS (Grammodes geometrica, Heliothis armigera, Spodoptera exigua, and Eublemma brachygonia) (the last on male flowers); a STEM BORER (Sphenoptera (Triopeltis) falgeus); a PHYCITID (Etiella zinckenella) on leaves; a SPIDER MITE (Eutetranychus orientalis); WHITEFLIES and CRICKETS.

Coffee Insects

A LEAF MINER (Leucoptera sp.) reported from the Congo, has been reported to be causing damage in Equatoria. The LEAF SKELETONIZER (Leucoplema (Epiplema) dohertyi) caused slight damage to shaded and thickly-planted coffee. COFFEE BERRY BORER (Stephanoderes hampei)* damage was reported up to 60-80% in fruits of older plantations in Yei District. Infestations were also reported from Maridi District. MEALYBUGS have spread over most of the coffee area of Maridi District where a number of plantations were sprayed successfully. Also reported were a COFFEE TRUNK BORER and THRIPS in the Yambio District.

Insects Affecting Man and Animals (Contributed by F. H. Khattat, WHO Entomologist)

MOSQUITOES: Anopheles gambiae, occurring throughout the country, is the main vector of malaria in the Sudan, Anopheles funestus is another major vector. There are several other secondary or potentially secondary vectors in the genus Anopheles. About 40 species of Anopheles are recorded for the Country. YELLOW-FEVER MOSQUITO (Aedes aegypti) is generally distributed. Although the 1940 yellow fever epidemic in the Nuba area was attributed to this species, two other Aedes in the area transmitted the disease experimentally to monkeys. Thirty-three species and varieties of Aedes are known from the Sudan. Culex pipiens fatigans is the main vector of filariasis in man. Sixteen other Culex species are known in the Sudan. PSYCHODIDS: Sand flies are widespread in Sudan. Phlebotomus papatasi is responsible for transmitting oriental sore (Leishmania tropica) and a virus, sand fly fever. Two other species, P. orientalis and P. clydei, are said to be vectors of Leishmania donovani (kala-azar) in the Sudan. CULICOIDES: Culicoides milnei and C. pallidipennis found in the Nuba area are the most annoying biters. Livestock are seriously annoyed by these insects. SIMULIDS: Simulium danesus and S. griseicollae are the main vectors of onchocerciasis. TABANIDS: Seventy-six species of tabanids are known from the Sudan. In addition to their harmful bites, they transmit many diseases of man and animals. MUSCIDS: Glossina morsitans and G. tachinoides transmit cattle trypanosomiasis in the southern tse-tse fly belt. G. palpalis transmits human sleeping sickness. Sleeping sickness areas are confined to a few isolated foci in Equatoria. Musca domestica, M. domestica vicina, M. sorbens, and M. lusoria are the most common species.

SUMMARY OF INSECT CONDITIONS - 1962

TURKEY

By F. M. Philips

Cereal and Forage Insects

A PENTATOMID (Aelia sp.) caused less damage to wheat in the central and western Anatolian Plains this year than in previous years. Over 50,000 acres were treated in 1962 however. SENN PEST (Eurygaster integriceps) was of little or no importance with only 2,000 acres being treated as the insect migrated from the mountains. CEREAL LEAF MINER (Syringopais temperatella) caused moderate to heavy damage on wheat in isolated areas throughout the cereal growing areas of Turkey. DESERT LOCUST (Schistocerca gregaria) migrated into Turkey from Iraq and Syria causing the treatment of approximately 15,000 acres of wheat and other cereals in parts of 6 provinces in southeastern Turkey. ALFALFA WEEVIL (Hypera postica) caused moderately heavy damage in extreme eastern Turkey and in one province in the western Anatolian Plains. ITALIAN LOCUST (Calliptamus italicus), MOROCCAN LOCUST (Dociostaurus moroccanus) and MIGRATORY LOCUST (Locusta migratoria) were light to moderate throughout Turkey and caused little or no damage. An APHID, (Cuernavaca noxius) caused heavy damage to wheat and barley in the Konya area.

Fruit Insects

CODLING MOTH (Carpocapsa pomonella) infested apples in the Nidge-Eregli area as high as 89% where one or less treatments were performed and from less than 1% infestation, in orchards that had eight sprays at regular intervals, to 45% in orchards with lesser numbers of sprays. A SPIDER MITE (Tetranychus sp.) caused heavy damage in the Nidge area on apples and light to moderate damage in other apple growing areas. An ERMINE MOTH (Hyponomeuta sp.) caused almost complete defoliation in the Çankiri area on apple trees which received no treatment. CHERRY FRUIT FLY (Rhagoletis cerasi), occurring in the southern and western Anatolian Plains, caused about 25% damage to the cherry crop. Over 250,000 peach and apricot trees were treated for ORIENTAL FRUIT MOTH (Grapholitha molesta) in the Bursa area. A SCALE INSECT (Diaspis sp.) caused a moderate amount of damage to peach and mulberry trees in the Istanbul-Bursa area. Another SCALE (Ceroplastes sp.) caused little damage on the fig crop in the Aegean coastal area. MEDITERRANEAN FRUIT FLY (Ceratitis capitata) infested less than 5% of the citrus crop on the Mediterranean Coast. It was non-existent in the Black Sea citrus growing area. CITRUS RUST MITE (Phyllocoptruta oleivora) caused moderate to heavy damage in the Adana Plains area on citrus. OLIVE FRUIT FLY (Dacus oleae) reportedly infested up to 30% of the olive crop in the Bursa-Gemlik area.

OLIVE MOTH (Prays oleellus) was so heavy in the Aegean coastal region that the Ministry of Agriculture treated nearly five million olive trees in an attempt to control it. BLACK SCALE (Saissetia oleae) caused moderately severe damage in the Gemlik area and light damage in Istanbul and Bursa. A VINE MOTH (Polycrosis botrana) was reportedly light to moderate on grapes throughout the grape growing areas of Turkey. An ARCTIID CATERPILLAR (Arctia sp.) was moderate on grapes in the Gaziantep-Kayseri-Konya area.

Truck Crop Insects

A CUTWORM (Agrotis sp.) caused a great deal of damage to cabbage and tomatoes in the Marmara Sea area. A MOLE CRICKET (Gryllotalpa sp.) inflicted light damage to truck crops and ornamentals in the central Anatolian Plains. The BALUCHISTAN MELON FLY (Myiopardalis pardalina) lightly damaged melons in the Kayseri-Nevşehir-Kirşehir area. TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina) caused moderate damage in the Diyarbakir and Sakarya areas.

Cotton Insects

SPINY BOLLWORM (Earias insulana) was light on cotton in the Adana Plains area and was reported to be light to moderate in the Diyarbakir area. PINK BOLLWORM (Pectinophora gossypiella) was estimated to have caused less than 4% damage to the cotton crop in the Izmir region and as much as 6% in the Adana Plains area. The OLD WORLD BOLLWORM (Heliothis armigera) caused localized heavy damage in the Adana area. A SPIDER MITE (Tetranychus sp.) was moderately damaging to cotton in the Adana area. COTTON APHID (Aphis gossypii) caused light to moderate damage on cotton in Adana and the Aegean coastal areas.

Stored Products Insects

Until May of 1962 the Ministry of Public Health in Turkey would not allow the Plant Protection General Directorate to treat stored grains for the control or prevention of stored products insects. In May after considerable debate between the two Ministries it was finally decided to allow treatment based on the allowable tolerances as set forth in the USDA Summary of Registered Agricultural Pesticide Chemical Uses. KHAPRA BEETLE (Trogoderma granarium) was found in grain storage in Ankara in May. CONFUSED FLOUR BEETLE (Tribolium confusum) was found in many areas throughout Turkey.

Miscellaneous Pests

A TEA SCALE (Pulvinaria floccifera) remains light on tea in the Black Sea area. BLACK CITRUS APHID (Toxoptera aurantii) caused a moderate amount of damage on tea in Artvin, Trabzon, and Rize Provinces. A FIELD MOUSE (Microtus microtus) caused losses of 5 - 10% to field crops in the eastern part of Turkey. A PARASITIC WEED (Orobanche cernu) caused heavy damage to sunflowers in the Thrace area. A resistant sunflower has been developed and should reduce the losses from this weed in the future. TOBACCO BLUE MOLD (Peronospora tabacina) caused an estimated 10% loss to the Turkish tobacco crop.

Table 1 RICE AERIAL DESERT LOCUST CONTROL OPERATIONS - 1962 - ETHIOPIA

Location	Amount Treated			Insecticide			Reconnaissance		Results and/or Remarks
	No. Swarms	No. Bands	Est. Acres	Kind	No. Gallons	Dosage	No. Flights	No. Hrs.	
1/1/62 Massawa Area	8	16	1,200	BHC 20	1,200	7 oz. per acre	5	10:45	100% on bands - 95% on fledgling swarms
2/15 - 3/15/62 Dire Dawa Area	3		60,000	BHC 16	6,000	4 oz. per acre	42	99:35	90% mortality - remainder broken up
6/1/62-6/15/62 Cercer Area		38	14,904	BHC 20	1,150	2.09 oz. per acre	16	79:20	Cercer and Ala River were completed same period - different insecticides were used with 98% mortality to bands
Ala River	1	9	10,368	Dieldrin 20% OS	800	2.09 oz. per acre			
Ala River			5,184	Dieldrin 20% EC	100	0.52 oz. per acre			
8/20/62 Quiha Area		15	16,400	Dieldrin 20% EC BHC 20%	340 100	0.73 oz. per acre 1.9 oz. per acre	14	23:00	100% mortality reported by Ethiopian locust scouts
Totals	12	78	108,056		9,690		77	212	

Table 2 USAID DESERT LOCUST CONTROL OPERATIONS - 1962 - AFGHANISTAN AND IRAN

AFGHANISTAN

Date and Location	Crop	Amount Treated Acres	Insecticide Actual Dosage	Control Results and Remarks
May 25 - June 30, 1962 Dori, Arghandab, Helmand River and Wadi area	Waste Land	6,000	Aldrin 2 1/2 oz. per acre in diesel fuel	Excellent 85 - 90% control 1 Air Force C-123
May 25 - June 30, 1962 Kandahar and Helmand Valley	Waste Land, Crop Areas	8,940	Aldrin 4 oz. per acre in water	Excellent 85 - 90% control 1 Cessna 180 aircraft
Total		14,940		

IRAN

March - August Kermanshah, Shahbad, Gharsi-Shirin, Ilam, Khorramabad, Shiras, Audakan Fasa, Darab	Waste Land	177,500	Aldrin 2-4 oz. per acre Dieldrin 1-2 oz. per acre	95% 1 Air Force C-123 5 Cessna 185 aircraft
Total		177,500		

Aircraft and pilots furnished by USAID/Afghanistan and USAID/Iran. Technical operations directed by RICP personnel.

Table 3

RIPC DEMONSTRATIONS - 1962 - AFGHANISTAN

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Citrus Psyllid	March 10 Jalalabad	Citrus	10		Endrin 20% E.C. 1 qt. in 50 gals.	By turbine blower about 50% control
Citrus Psyllid	April 4 Jalalabad	Citrus	10		Endrin 20% E. C. .05% spraystrength	By hand pressure sprayers, 100% control reported
Flies, Mosquitoes	March 21 Lashkar Gah	Citrus	40		Malathion 50% E.C. 1 gal. to 50 gals. water	By turbine blower reported excellent
Aphids	April 23 Kabul	Roses	1		Malathion 50 2 pts. to 100 gals.	By hand sprayers no report
Stored grain pests	April 19 Kabul	Wheat			Carbon tetrachloride 4 gals. per 1000 bu.	Only 50% effective Canvas tarps not tight enough
Kaphra Beetle	March 23 Marja	Stored Wheat			Malathion 50% E.C. 1 gal. to 50 gals. water	For cleaning and re- ducing infestation
Total			61			

Table 3 (continued)

RICP DEMONSTRATIONS - 1962 - SUDAN

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Red Melon Beetle	April Khartoum	Melons	6		Dimecron at 1 lb. per acre and at 2 lbs. per acre	50% 100% except <u>Dacus</u> sp. sprayed 3 times
Ladybug Melon Beetle Spider Mites Melon Fruitfly						
Onion Thrips	April Khartoum	Onions	2		Dimecron at 1 lb. per acre and at 2 lbs. per acre	50%) : sprayed 2 times 98%)
Mealybugs and Ants Stemborer	April Yambio	Cacao		100	Dieldrin 20%	Painted tree trunks 100% mealybug and ants, stemborer ?
Scales	May Maridi	Oranges		20	Kerosene 1% in water	Most scales dried up, sprayed 2 times
Orange Dog Hornworm Grasshoppers	May Maridi	Citrus		700	Dieldrin 1 lb. per acre	100%
Mealybug Scales	June Khartoum	Grape Mango		25 5000	Rogor 0.5 lb. per acre	not controlled
Mealybug and Ants	July Khartoum	Grape		25	Aldrin 2 lb. per acre	soil treatment
Scales	July Khartoum	Mango		400	Sevin 2.5 lbs. per acre	100%
Scales	July Omdurman	Roses		25	Rogor 0.5 lb. per acre	90%
Mealybug	August Khartoum	Grape		25	Sevin 2.5 lbs. per acre	100%
Scale	August Khartoum	Mango		1000	Sevin 2.5 lbs. per acre	100%

Table 3 (continued)

RICP DEMONSTRATIONS - 1962 - SUDAN

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Thrips	August Khartoum	Roses		50	Sevin 2.5 lbs. per acre	100%
Leafhopper	September Geraif	Eggplant	1		Sevin 2 lbs. per acre	99%
Tomato Fruitworm Melon Beetle	September Geraif	Tomato	1		Sevin 2 lbs. per acre	99%
Termites Ants Rice Weevil	May Maridi	Stored Peanuts Bananas	1 warehouse 28,248 cu. ft.		DDVP 1% 1 pt. per 800 cu. ft.	100%
Khapra Beetle Cockroaches Flour Beetles Silverfish Rice Moth	August Port Sudan	Melon seeds Bean cakes Sesame cakes Beans	1 warehouse 3,177,900 cu. ft.		Malathion 0.12 lbs per 50,000 cu. ft.	Fog application treated twice, two weeks apart Exposed insects 100%
Flour Beetles	August Port Sudan	Wheat Peanuts Seed cakes	1 warehouse 1,147,575 cu. ft.		DDT 0.15 lbs per 50,000 cu. ft.	Fog application treated twice, two weeks apart Exposed insects 100%
Khapra Beetle Flour Beetle Silverfish Cadelle Cockroaches Rice Moth	August Port Sudan	Durra Peanuts Gum Arabic Cottonseed	1 warehouse 1,588,950 cu. ft.		DDVP 1% 1 pt. per 8,000 cu. ft.	Exposed insects 100%

Total Trees 7370 Total Acres 10 Total Cubic Feet 5,942,673

Table 3 (continued)

RIPC DEMONSTRATIONS - 1962 - TURKEY

Pest	Date and Location	Crop	Amount Treated Trees	Insecticide Actual Dosage	Control Results and Remarks
<u>Carpocapsa pomonella</u>	April, May, June, July, August Tokat, Eregli, Nidge	Apple	504	Sevin 50 WP .24 oz. per gal.	81 - 99% control
<u>Carpocapsa pomonella</u>	April, May, June, July, August Tokat, Eregli, Nidge	Apple	504	DDT 50 WP .31 oz. per gal.	84 - 97% control
Red Spider	April, May, June, July, August Tokat, Eregli, Nidge	Apple	756	Tedion emulsion 18% .24 oz. per gal.	95 - 100% control
Aphids	April, May, June, July, August Tokat, Eregli, Nidge	Apple	72	Malathion emulsion 20% .4 oz. per gal.	95 - 100% control

Total Trees 1,836

Table 4 MINISTRY AERIAL SPRAY PROGRAMS - 1962 - ETHIOPIA

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
African Cotton Jassid Whitefly Spiny Bollworm	Oct. 17 - 20 Tandaho area	Cotton	3,000		Endrin .07 lbs. per acre DDT 1.5 lbs. per acre	95% mortality on Jassid and Whitefly but further applications for Spiny Bollworm must follow to assure good results
Total			3,000			

Table 4 (continued) MINISTRY AERIAL SPRAY PROGRAMS - 1962 - MOROCCO

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Spiny Bollworm	June - Sept. Beni Mellac Nador	Cotton	69,000		Endrin	3 applications on 23,000 acres
Pink Bollworm			46,000		Sevin	2 applications on 23,000 acres
Total			115,000			

Table 4 (continued) MINISTRY AERIAL SPRAY PROGRAMS - 1962 - TURKEY

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
<u>Zabrus</u> sp.	April Afyon, Aydin, Eskişehir	Wheat	8,750		DDT 10% 26 lbs. per acre	90 - 95% control
<u>Eurygaster</u> sp.	April Elazig, Diyarbakir	Wheat	1,800		Dipterex dust 5% 17 lbs. per acre	95 - 100% control
<u>Prays oleellus</u>	April and May Aegean Coast	Olives		4,771,075	DDT dust 10% 26 lbs. per acre DDT WP 50% 6.5 lbs. per acre	50 - 95% control
<u>Schistocerca gregaria</u>	May Bitlis, Urfa, Diyarbakir, Hakkari, Mardin, Siirt	Cereals	13,775		BHC 2.6% 44 lbs. per acre BHC 6.5% 17 lbs. per acre 3-10-0 44 lbs. per acre	95 - 100% control
Total			24,325	4,771,075		

Table 5 RICE AERIAL SPRAY DEMONSTRATIONS - 1962 - ETHIOPIA

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Green Stink Bug (<i>Nezara viridula</i>)	Jan. 15 Massawa	Corn	2,200		Acrodel 11% 7 oz. per acre	100%
Total			2,200			

Table 5 (continued) RICE AERIAL SPRAY DEMONSTRATIONS - 1962 - SUDAN

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Tree Locust	Sept. 22-24 Gebel Merkhiyat	Range Land	1,800		Dieldrin 0.16 lbs. per acre	99%
Durra Pest	October Kosti District	Range Land	6 6 6		S1752 (Bayer) Toxaphene Endrin	50% No results reported No results reported
Total			1,818			

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - AFGHANISTAN

Table 6

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees Vines		
Codling moth Aphids Ermine moth	May 23-July 28 Coriz-i-Mir	Apple Peach		10,000	Malathion 50% 2 lbs.-100 gals.	Fair - only two applications
Mildew	May 23-July 28 Coriz-i-Mir	Apricot Grapes		25,000	Sulfur dust	50% - two applications Improper timing
Jassids, Aphids, Cutworms	Summer Baghlan	Cotton	22,625		Malathion - 2% BHC dust 10-15 lbs.per acre	Reported 80% effective control
Aphids, Cutworms Fruit flies, etc.	May-June Jalalabad	Vegetables	4		Malathion 50% 2 lbs.-100 gals.	No report - extension program on Ministry garden
Total			22,629	35,000		

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - ETHIOPIA

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees Vines		
Desert Locust	4-10-62 Jijiga Area	Range Land	200		Dieldrin 20% EC 4 oz. per acre	Exhaust sprayers
Desert Locust	10-14-62 Desse Area	Range Land	12,352		Bait 3 lbs. per acre	Reported 100% mortality
Mildew Pepper worm	11-22-61 Ambo	Pepper	.01		Copper oxide 5 lbs. per acre Malathion .05 gr. per acre	No results 100% control of worm
Mildew	12-11-61 Addis Ababa	Grape		.75	Copper oxide 2 lbs. per acre	100%
Leafhopper	12-20-61 Assieta	Cotton	.01	Plants	Malathion .05 gr. per acre	100%
Termites	12-22-61 Addis Ababa	Building			Dieldrin 25 gr. to 5 gals. H ₂ O to 75 lineal feet	100%
Red ants	1-11-62 Bacco	Cabbage	0.02	Plants	Dieldrin 3 lbs. per acre	100%
Red ants	2-23-62 Addis Ababa	Garden	.02	Plants	Dieldrin 3 lbs. per acre	100%
Sitophilus oryzae	2-4-62 Bulbula	Stored corn	2.5	Tons	Phostoxin 10 tab. per ton	100%
Sitophilus oryzae	1-6-62 Agara	Stored corn	2	Tons	Phostoxin 10 tab. per ton	100%
Sitophilus granarius	5-10-62 Rabi	Stored corn	65	Tons	Phostoxin 10 tab. per ton	100%
Sitophilus granarius	5-14-62 Karakorie	Sorghum grain	.75	Tons	Phostoxin 10 tab. per ton	100%

Total Acres	12,554
Total Tons of Grain	70.25

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - LIBYA

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
<u>Parlatoria oleae</u>	February Tripoli Area	Pear		1,140	White oil and Parathion 2%	Very good
Codling moth	March Tripoli	Apple Pear		900 4,098	Sevin 50% W.P. .26 oz. per gal.	Good (first year for Sevin)
Codling moth	March Tripoli	Quince		100	Sevin 50% W.P. .26 oz. per gal.	
Mediterranean fruit fly Scale insects	September Tripoli	Citrus		29,927	Malathion W.P. and Protein .5 oz. per gal. White oil 2%	Good - program still in progress
Mediterranean fruit fly	May Tripoli	Peach		845	Rogor 20%	Very good
Mediterranean fruit fly	April Tripoli	Apricot		900	Rogor 20%	Very good
Aphids	April Tripoli	Almond		230	Malathion 50% E.C., .01 oz. per gal.	Good
Total				38,140		

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - MOROCCO

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Scale insects	January Fez	Fruit trees		25	Dormant sprays	
	El Hajeb			70	Dormant sprays	
	Kenifra			100	Dormant sprays	
	Azrou			150	Dormant sprays	
<u>Cossus cossus</u>	February Aïn Taoujdate	Fruit trees			Calcium cyanide, Paradichlorobenzene, Dieldrin, Vapam, Nemagon, BHC	Five demonstrations each using a different chemical
<u>Cossus cossus</u>	February Kenifra	Apricot			BHC, Calcium cyanide, Paradichlorobenzene, Dieldrin	Five demonstrations each using a different chemical
	Immouzer Fez			70	Vapam, Nemagon	
	April Kenitra			53	Mercaptan	
Mites		Fruit trees				
Dacus, Psylla	April Fez	Olive		947	Parathion	Three separate demonstrations
	April Fez			278		Three treatments
	May Ouled Frej		14		DDT 10%	
<u>Spodoptera exigua</u>		Alfalfa				
Scale	May Tangier	Citrus			Dimethyparathion and white oil	
Scale	May Imsoeren	Citrus				
<u>Prays oleellus</u>	Al Houcemas	Citrus				
	May Al Houcemas	Olive			Methylparathion	

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - MOROCCO

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Actual Dosage	Control Results and Remarks
			Acres	Trees		
<u>Dacus oleae</u>	May Al Houcemas	Olive			Methylparathion	
Sesamia	June Sidi Selemame	Corn			Nicotine, dieldrin, sevin	three demonstrations
<u>Aonidiella aurantii</u>	February El Kelaa	Citrus				
<u>Dacus oleae</u>	March Sais	Olive				
<u>Sesamia cretica</u>	April Kenitra					
<u>Saissetia oleae</u>	April Kenitra	Olive				
<u>Prays oleellus</u> and <u>Psylla</u>	April several locations	Olive				
<u>Rhizotrogus</u>	January several locations					Good to excellent
<u>Aphids</u>	May El Hajeb					
<u>Ermine moth</u>	May Azrou					
<u>Ermine moth</u>	May Fez	Vine- yards				Very effective

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - MOROCCO

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Ermine moth	May Taza	Vineyards				Very effective
Elm leaf beetle	May Fez	Elm trees				
Codling moth	May Fez	Fruit trees		25		
Scale	June Fez	Citrus		45		three separate locations
Cutworms	June Tangier	Various crops				Several demonstrations
Total				1,763		

Complete information on GOM demonstrations was unavailable, above is a partial tabulation of demonstrations.

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - SUDAN

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Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Desert locust	Jan.-Feb. Red Sea Hills	Range land	215,000		BHC 0.1 lbs. per acre	
Tree locust	Jan.-Feb.-March North.Khartoum Province	Riverian areas	1,100		BHC 0.1 lb. per acre	
Tree locust	March-April-May Southern Khartoum Province	Riverian areas	609,000		BHC 0.1 lb. per acre	
Tree locust	Jan.-April Um Inderaba	Desert range	8,000		BHC 0.1 lb. per acre	
Tree locust	Jan.-June Kosti District	Desert range	125,000		BHC 0.1 lb. per acre	
Tree locust	Sept.-Oct. El Obeid Dist.		15,000		BHC 0.1 lb. per acre	
Mealybugs	July-August-September Khartoum	Garden trees		90,000	Rogor 0.5 lb. per acre Sevin 2 lbs. per acre BHC 0.1 lb. per acre Chlordane 2 lbs. per acre Aldrin 2 lbs. per acre	745 gardens treated
Scale						
Thrips						
Termites						
Ants						
Mealybug-ant complex	May Shendi Dist.	Guava	20		BHC 1.3 lbs. per acre	
Ants	May Shendi Dist.	Mango		200	BHC 1.3 lbs. per acre	

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - SUDAN

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Scales	May Shendi District	Mango		200	Rogor 0.5 lb. per acre	
Thrips	May Shendi District	Onion	150		DDT 0.5 lb. per acre	
Armyworm	June Kassala	Berseem	40		DDT .75 lb. per acre	
Tingids and Jassids	June Kassala	Eggplant	10		Malathion 1 lb. per acre	
Grasshopper	June Khasim El Ghirba	Sugar cane	17		BHC 0.1 lb. per acre	
Scale	June, Khasim El Ghirba	Date palm		50	Rogor 0.5 lb. per acre	
Armyworm	June, Khasim El Ghirba	Kenaf	20		Malathion 1 lb. per acre	
Armyworm	June, Khasim El Ghirba	Peanut	20		Malathion 1 lb. per acre	
Bollworm	July, Khasim El Ghirba	Kenaf	20		DDT 0.75 lb. per acre	
Jassids	July, Khasim El Ghirba	Cotton	6		DDT 0.75 lb. per acre	
Cutworm	July, Khasim El Ghirba	Kenaf	20		DDT 0.75 lb. per acre	
Cutworm	July, Khasim El Ghirba	Peanut	20		DDT 0.75 lb. per acre	
Stalkborer	July, Khasim El Ghirba	Durra	40		Dieldrin 0.25 lb. per acre	
Fleabeetle	July, Khasim El Ghirba	Kenaf	10		DDT 0.75 lb. per acre	

MINISTRY OF AGRICULTURE CONTROL OPERATIONS AND DEMONSTRATIONS - 1962 - SUDAN

Table 6 (continued)

Pest	Date and Location	Crop	Amount Treated		Insecticide Actual Dosage	Control Results and Remarks
			Acres	Trees		
Fleabeetle	July, Khasim El Ghirba	Guar	10		DDT 0.75 lb. per acre	
Fleabeetle	July, Khasim El Ghirba	Cotton	6		DDT 0.75 lb. per acre	
Migratory locust	July, Khasim El Ghirba	Sugar cane	17		BHC 0.1 lb. per acre	
Fleabeetle	August Gedaref Dist.	Cotton	130		Dieldrin 0.25 lb. per acre	Used exhaust nozzle sprayer
			60		DDT 0.50 lb. per acre	
			105		BHC 0.13 lb. per acre	
Total			973,821	90,450		

Table 7 PLANT PEST CONTROL EQUIPMENT IMPORTED - 1962

<u>Article</u>	<u>Source and No.</u>		<u>Agency Importing</u>		
	U. S.	Other	USOM	Ministry	Other
<u>AFGHANISTAN</u>					
200 gallon trailer-type power sprayer	2		X		
Buffalo turbine sprayer	1		X		
John Bean 500 gallon air flow sprayers	2				X
Knapsack sprayers		600			X
<u>IRAN</u>					
Piper Cubs	5			X	
Exhaust sprayers		10		X	
Jeep trucks	5		X		
Jeep station wagons	15		X		
<u>LIBYA</u>					
Radio - Rediphone		1			X
Laboratory equipment	X		X		
Sprayer - solo mist blower	3		X		
Aircraft workshop equipment and tools	X		X		
Centrifugal water pumps	4		X		
Motor pump 400 liters		1		X	
Hand operated pumps 100 liters		100		X	

Table 7 PLANT PEST CONTROL EQUIPMENT IMPORTED - 1962

<u>Article</u>	<u>Source and No.</u>		<u>Agency Importing</u>		
	<u>U. S.</u>	<u>Other</u>	<u>USOM</u>	<u>Ministry</u>	<u>Other</u>
<u>MOROCCO</u>					
Tractor mounted with engine		20			X
Tractor mounted without engine		32			X
Self-propelled motorized equipment		57			X
*Hand, backpack, skid and trailer mounted power operated	4	48			X
*Knapsack type hand operated		15,635			X
*Bucket pumps, flit guns, aerosols, etc.		45,392			X
Other unspecified		1,578			X
* Estimate based on numbers and weights--not broken down as to type in import statistics.					
<hr/>					
<u>SUDAN</u>					
Ford pickup truck	5		X		
Portable mist blower	5		X		
Power knapsak sprayer		5		X	
Bucket type sprayer		24		X	
Dynafof sprayer	3		X		
Cessna 180 spray plane		2		X	

Table 7 PLANT PEST CONTROL EQUIPMENT IMPORTED - 1962

<u>Article</u>	<u>Source and No.</u>		<u>Agency Importing</u>		
	<u>U. S.</u>	<u>Other</u>	<u>USOM</u>	<u>Ministry</u>	<u>Other</u>
<u>TURKEY</u>					
Power applicators	30	5,228		X	
203 dusters					
429 sprayers					
4,368 dust, spray combination					
258 pulverizers					
Hand applicators		2,174		X	
250 dusters					
1,924 sprayers					
Spray planes (Cubs)	7				X
Spray planes (Pezeta)		6			X
Spare parts for spray planes		X			X

Table 8

PESTICIDES IMPORTED - 1962 - AFGHANISTAN

Insecticide (Formulation & Strength)	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons
Aldrin 40% EC				7.75		
Aldrin 20% Gran.		1.75				
BHC Dust					351.0	
Dieldrin dust 20%					8.0	
Dieldrin 20% EC	.05					
DDT 50% WP		50 lbs.				
DDT 25% EC	.05					
Endrin 20% EC				23.85		
Heptachlor Conc.	.05					
Malathion 50% EC	.02					
Total (Afghanistan)	.17			31.60	359	

Table 8 (continued) PESTICIDES IMPORTED - 1962 - ETHIOPIA

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
Insecticide (Formulation & Strength)	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons
Acrodel 16% oil solution						55.82
Acrodel 16% Em. Con						200.14
Aldrin 40% oil solution	80					
Aldrin 40% Em. Con.	40					
Dieldrin 20% oil solution	160					
Dieldrin 20% Em. Con.	40			20		21.15
Dieldrin 20% formula F						438.23
DNC in oil						194.80
Bran imp. with 16% BHC				713		6.31
Malathion 75% Em. Con.	20					
Gamex. Disp. powder						.065
Agroicide						7
Agroicide dust 10%						4.08
Total	340			20	713	910.14 11.04

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - IRAN

Insecticide (Formulation & Strength)	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
	Gals.	Tons	Gals.	Tons	Gals.	Tons
	Gals.	Tons	Gals.	Tons	Gals.	Tons
Aldrin						4.35
BHC 6% WP						43.0
BHC 12% WP			29.00		152.0	
Dieldrin 100%			0.70		0.50	
DDT 75% WP			28.80		21.5	
Dipterex					33.00	
Dithane Z 78			10.00		10.00	
Diazinon					2.78	
Endrin					2.00	
Gusathion					25.00	
Karathane			0.50		0.50	
Kelthane					0.60	
Lindane 100%			.187		1.40	
Lindane 50% W			1.50		0.60	
Lindane 25% W			2.80		30.90	

Table 8 (continued) PESTICIDES IMPORTED - 1962 - IRAN

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
Insecticide (Formulation & Strength)	100	100	100	100	100	100
	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons
Multanin Ultra (lindane)						5.0
Lead arsenate						3.0
Malathion		10.00			13.77	
Marlate			0.50			
Metasystox					30.00	
Metaldehyde						0.50
Melprex (lindane-fedio)			0.35			0.25
Oleo-Parathion					409.00	
Parathion 25%		90.00			199.69	
Paradichlorobenzene						1.0
Phosphamiden					1.65	
Sulphur WP			55.00			22.00
Tedion emulsion					9.33	
Thiodan						6.30

Table 8 (continued) PESTICIDES IMPORTED - 1962 - IRAN

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
Insecticide (Formulation & Strength)	100 Gals.	100 Tons Gals.	100 Tons Gals.	100 Gals.	100 Tons Gals.	100 Tons Gals.
Toxaphene 60% EC			405.			3.00
Tox - DDT		224.00				
Gelimton						7.60
Muillant (emulsifier)			20.60			4.00
Commonsense			1440			
Castrix						1.18
Zelio- paste and grain						2.25
Ceresan						109.50
Cupranit						3.00
Dupher seed dressing (mercury)						15.00
Fermate					0.25	
Granosam M (mercury)					1.20	
Jelosan (mercury)						5.00

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - IRAN

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
Insecticide (Formulation & Strength)	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons	100 Gals. Tons
Leytosan (mercury)						3.35
Panogen (mercury)					4.60	
Pomarsol (zinc)						0.25
Zinab (zinc)						11.50
Dalpon						2.00
DDT 50% WP			18.75			4.00
Total (Iran)		324.00	2015.13		714.29	491.56

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - LIBYA

(Formulation & Strength)	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100 Gals.	100 Gals.	100 Gals.	100 Gals.	100 Gals.	100 Gals.
Aldrin EC	1.00					2.25
Diazinon 60% EC	.85					.25
Dieldrin 19.5% EC	.50					
Dicaphon 25% EC	.10					
DDT 50%						.50
Diptrex						2.25
Ethion EC	.20					
Guthion EC	.50					
Kelthane 18.5% EC	.30		.50			
Lindane 5%		.025				1.00
Malathion 25% WP		.50				
Malathion 50% EC	4.00		3.55			3.70
Malathion WP		.50				4.25
Metasystox EC	.60					

Table 8 (continued) PESTICIDES IMPORTED - 1962 - LIBYA

Insecticide (Formulation & Strength)	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons
Parathion 20% EC						4.70
Perthane EC	.10					
Phostoxin		.05				
Sevin 50% WP		.10	.25			
Tedion WP		.05				1.75
Terrachlor 75% WP		.05				
Captan WP		.15				
Maneb		.15	1.00			
Dalapon (herbicide)		.10				
Xylene	.50					
Warfarin		.025				
Total (Libya)	8.65	13.50	3.55	1.75	10.15	10.50

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - MOROCCO

(Formulation & Strength)	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons
BHC						67.9
DDT			86.5			.1
Lead arsenite						2.0
Methyl bromide						4.6
Pyrethrum						.6
Sodium arsenate						5.5
Sodium fluosilicate						10.7
Unspecified copper base						498.4
Unspecified sulfur base						2.9
Miscellaneous unspecified			386.3			1829.0
Total (Morocco)			472.8			2421.7

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - SUDAN

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
Insecticide (Formulation & Strength)	100	100	100	100	100	100
	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons
Aldrin	20					
Abavit						87
BHC						430
Chlordane					12	
DDT		500	83		512	2750
DDVP						0.15
Dieldrin	30				50	5.5
Dimecron						1.25
Endrin	900			1300		2650
Ethylene dichloride Carbon tetrachloride					30	
Malathion	10		1			
Methyl bromide					2.75	
Metasystox						5

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - SUDAN

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
Insecticide (Formulation & Strength) Gals. Tons Gals. Tons Gals. Tons						
Potassium cyanide					2	
Rogor					40	443
Sevin		2				
Toxaphene			335			
Tomorin				0.25		
Warfarin						0.5
Total (Sudan)	60	900	2 500 419	0.25 1914 40.25 5849.4		517.5

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - TURKEY

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
Insecticide (Formulation & Strength)	Gals.	Tons	Gals.	Tons	Gals.	Tons
BHC						1686.00
Dieldrin (tech.)			.60			2.00
Dieldrin 50% WP						24.00
Dipterex 50% WP						180.00
Dithane Z-78						42.00
DDT (tech.)			122.00			991.00
Endrin (tech.)						21.40
Carbon tetrachloride						
Ethylene dichloride						98.70
Gusathion						106.60
Lindane (tech.)						5.4
Malathion (tech.)			12.0			
Malathion 5% misc			29.8			
Parathion 20% emul.						236.00
Sevin			60.00			

Table 8 (continued)

PESTICIDES IMPORTED - 1962 - TURKEY

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
Insecticide (Formulation & Strength)	Gals.	Tons	Gals.	Tons	Gals.	Tons
Sevin 50% WP						12.00
Sulfur 80 mesh			1.20			4.80
Sulfur wettable			27.00			537.00
Tedion 18% emul.					62.00	
Toxaphene tech.						60.00
Cotton dust DDT			200.00			1020.00
Toxaphene, sulphur						
Winter oil					849.00	
Zineb 65%						156.00
Copper fungicide						89.70
Copper sulfate						1482.00
Leytosan (mercuric)						360.00

Table 8 (continued)

PRESTICIDES IMPORTED - 1962 - TURKEY

	Imported from U. S.			Imported from other Countries		
	USAID	Ministry	Other	USAID	Ministry	Other
	100	100	100	100	100	100
Insecticide (Formulation & Strength)	Gals.	Tons Gals.	Tons	Gals.	Tons Gals.	Tons
Agroxon 4						36.00
Cebetox 40-60						13.30
Gesatope						53.30
2-4-D						133.0
Lebacyde						26.6
Total		29.8	422.80		1635.90	6651.90

Table 9 PLANT PROTECTION IN-SERVICE TRAINING - 1962

Country	Type of Training	Date Locality	Number Trainees	Subject and Remarks
<u>LIBYA</u>	Plant Protection Locust Control Off. Extension Agents	Feb. 7-10 Tripoli	25	
	Desert Locust Control Off.	Aug. 14-22 Tripoli	8	Plant pest survey training course
	Extension Agents	Sept. 1-11 Cyrenaica	45	Plant protection
	Plant Protection and Extension	Oct. 8-11 Tripoli	8	Plant pest sur- vey training course
	Extension Agents	Oct. 13-14 Sebha Fezzan	41	Plant protection
	Total		127	

Table 9 PLANT PROTECTION IN-SERVICE TRAINING - 1962
(continued)

Country	Type of Training	Date and Locality	Number Trainees	Subject and Remarks
<u>SUDAN</u>	Plant Protection	January Tokar	6	Insect survey Insect control
	Plant protection	April Khartoum	4	Operation of spray- ing equipment Insect control
	Plant protection	May Equatoria	2	Insect survey Insect control
	Plant protection	August Port Sudan	6	Insect control Spray equipment operation
	Plant protection	September Khartoum	60	Films on insects, Insect control Insecticides
	Agriculture Extension	September North Khartoum	100	Films on insects, Insect control Insecticides
	Plant protection	September Merkhiyat	5	Insecticide and sprayer operation
	Plant protection	Aug. & Sept. Merkhiyat	6	Loading and handling of chemicals in spray plane operation, plane safety
	Total		189	

Table 9 PLANT PROTECTION IN-SERVICE TRAINING - 1962
(continued)

Country	Type of Training	Date and Locality	Number Trainees	Subject and Remarks
<u>TURKEY</u>	Lecture and film	Jan. 8 Ankara	19	Insect survey
	Lecture	Jan. 28 Yenice	72	Tobacco blue mold
	Lecture	March 14 Bolu	16	Tobacco blue mold
	Lecture and demonstration	April 27 Izmir	42	Tobacco blue mold
	Lecture and demonstration	Aug. 23 Manisa	39	Extension methods and control equipment operation
	Lecture and demonstration	Sept. 4 Eskişehir	41	Extension methods and control equipment operation
	Lecture and film	Oct. 3 Ankara	19	Plant quarantine
	Lecture and film	Oct. 4 Ankara	43	Plant quarantine
	Lecture and demonstration	Oct. 8 Samsun	32	Extension methods and control equipment operation
	Lecture and demonstration	Oct. 11 Erzincan	31	Extension methods and control equipment operation
	Total		354	

Table 10

PILOT AND MECHANIC TRAINING - 1962

Country	Type of Training	Number of Trainees	Duration of Training	Remarks
<u>ETHIOPIA</u>	Techniques of aerial spraying (pilots)	2	10 months	Training of Ethiopian spray pilots terminated upon completion of spray program of 3,000 acres of cotton. Ethiopian pilots conducted actual spraying, RICP personnel acted in advisory capacity only.
	Total	2		
IRAN	Pilot and spray pilot	3	9 months, 50 hours each	1 completed training 2 continuing training
	Aircraft magneto	7	1 week	7 completed training
	Aircraft carburetor	7	1 week	7 completed training
	Aircraft engine oiling system	7	1 week	7 completed training
	Pilot	10	3 months 12 hours each	Refresher
	English	2	4 hours weekly	
	Ground support	<u>40</u>	2 hours each	Iran Army
	Total	76		

Table 10 PILOT AND MECHANIC TRAINING - 1962
(continued)

Country	Type of Training	Number of Trainees	Duration of Training	Remarks
<u>SUDAN</u>	Pilot	3	6/14 - 10/31	Flight training advanced
	Ground school	2	6/14 - 10/31	Academics and flight maneuvers
	Mechanics	1	6/14 - 10/31	on-the-job training
	Pilot	4	12 months	NATP course in Ethiopia
	Pilot	<u>1</u>	2 months	dropped out
	Total	11		

Table 11 PARTICIPANT TRAINING - 1962

Origin	Name of Participant	Country to Which Sent	Duration of Training	Type of Training
<u>AFGHANISTAN</u>	Anwar Sadek	W. Germany	2 years	Plant Protection
	Mohammed Yunisie*	W. Germany	2 years	Plant Protection
	Ajruddin Vasoddin**	USA	1 year	Plant Protection
	Ata Mohammed Faquiri**	USA	1 year	Plant Protection
<u>IRAN</u>	Abdl Azim Dezfulian	USA	10 months	Econ. Entomology
	Esfandiar Neshaty	None	indefinite	English proficiency
	Hosseini Parishan	None	Indefinite	English proficiency
<u>SUDAN</u>	Ahmed Ragab	USA	3½ months	Plant Quarantine
	Salah Tewfik	USA	3½ months	Plant Quarantine
<u>TURKEY</u>	Remzi Dikyar**	USA	12 months	Biological control
	Kemal Akman**	USA	12 months	Insects of Deciduous fruits

* Recently returned from West Germany.

** Departed December 1962.

Table 12 PLANT PEST CONTROL FUNDS - 1962

Breakdown of Expenditures		USAID Dollars	Ministry Dollar Equivalent
<u>AFGHANISTAN</u>			
Normal USAID Plant Protection Budget		\$10,000	
Special USAID Locust Budget--1962 Planes and insecticide		27,500	
Normal Ministry Af. Budget			\$ 64,930
Ministry Locust Budget - 1962			12,410
Ministry Dollar Budget			
Salary for foreign experts	\$19,200		
International travel	1,500		
Insecticide (from Bayer)	5,200		
Laboratory equipment	6,480		
For new vehicles	<u>17,780</u>		<u>50,160</u>
Total		\$37,500	\$127,500
<u>ETHIOPIA</u>			
Locust Control			<u>\$140,000</u>
Total			\$140,000
<u>IRAN</u>			
Government of Iran			\$1,118,421
Plan Organization			1,541,078
Special activities account			<u>72,194</u>
Total			\$2,731,693

Table 12 PLANT PEST CONTROL FUNDS - 1962
(continued)

Breakdown of Expenditures	USAID Dollars	Ministry Dollar Equivalent
<u>LIBYA</u>		
Ministries		\$ 300,000
Total		\$ 300,000
<u>MOROCCO</u>		
Personnel		\$ 500,481
Automotive (operations and repairs)		459,103
Buildings (rent and maintenance)		39,121
Supplies		283
Insecticides		412,282
Aircraft rental		531,123
Contractural services		69,205
Communications		9,603
U. N. Special Fund Contributions		16,698
Grants for Research Section		<u>41,271</u>
Total		\$2,079,170

Table 12 PLANT PEST CONTROL FUNDS - 1962
(continued)

Breakdown of Expenditures	USAID Dollars	Ministry Dollar Equivalent
<u>SUDAN</u>		
Personnel		\$ 213,161
Insect control campaigns		2,067,201
Participants	\$25,000	
Equipment	2,000	
Other	<u>8,000</u>	<u>373,546</u>
Total	\$35,000	\$2,653,908
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<u>TURKEY</u>		
Equipment	\$ 5,000	\$ 288,888
Insecticides	1,100	2,696,666
Participant trainees	20,000	
Salaries and other expenses	<u> </u>	<u>3,403,334</u>
Total	\$26,100	\$6,388,888
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